VPDES PERMIT FACT SHEET

This document gives the pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **minor municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

The discharge results from the operation of a **0.10 MGD extended aeration plant** serving the community of Riner. This permit action consists of revising the effluent limits for BOD_5 and final Total Kjeldahl Nitrogen; adding ammonia, E. coli, copper, TRC (alternative disinfection), and zinc limitations; removing fecal coliform; and revising the special conditions. (SIC Code: 4952)

1. **Facility Name and Address:**
   Riner WWTP
   755 Roanoke Street, Suite 1I
   Christiansburg, VA 24073
   Location: 4351 Riner Road, Montgomery County, Virginia

2. **Permit No: VA0024040** Existing Permit Expiration Date: September 20, 2008

3. **Facility/ Owner Contact:** Mr. Bruce Jones, Water/Wastewater Supervisor (540) 268-5143

4. **Application Complete Date:** May 9, 2008
   Permit Drafted By: Becky L. France, Environmental Engineer Senior
   Date: July 23, 2008, Revised 8/18/08
   DEQ Regional Office: West Central Regional Office
   Reviewed By: Kip D. Foster, Water Permit Manager
   Reviewer's Signature: 8/10/08 Date: _____
   Public Comment Period Dates: From 8/19/08 To 9/17/08

5. **Receiving Stream Classification:**

Receiving Stream:	Mill Creek (River Mile: 5.12)		
Watershed ID:	VAW-N21R		
River Basin:	New River		
River Subbasin:	NA		
Section:	2		
Class:	IV		
Special Standards:	v		
7-Day, 10-Year Low Flow:	0.11 MGD	7-Day, 10-Year High Flow:	0.22 MGD
1-Day, 10-Year Low Flow:	0.10 MGD	1-Day, 10-Year High Flow:	0.18 MGD
30-Day, 5-Year Low Flow:	0.17 MGD	Harmonic Mean Flow:	0.45 MGD
Tidal:	No	303(d) Listed:	Yes

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements:** III

7. **Reliability Class:** II

8. **Permit Characterization**:

( )	Private	( )	Interim Limits in Other Document
( )	Federal	( )	Possible Interstate Effect
( )	State		
(X)	POTW		
( )	PVOTW		

9. **Wastewater Treatment System:** A description of the wastewater treatment system is provided below. See **Attachment B** for the wastewater treatment schematic and **Attachment C** for a copy of the site inspection report. Treatment units associated with the discharge are listed in the table below.

Table I
DISCHARGE DESCRIPTION

Outfall Number	Discharge Source	Treatment (Unit by Unit)	Flow (Design) (MGD)
001	Riner WWTP	comminuitor grit screen equalization basin aeration basins (2) secondary clarifiers (2) uv disfection banks parshall flume aerobic sludge digestors (2)	0.10

The Riner WWTP operates a 0.10 MGD extended aeration package plant system. Wastewater from the surrounding community flows through a grinder pump, an equalization basin, and a communitor. One of the treatment trains is currently used. Each treatment train consists of a diffused aeration basin, secondary clarifier, and aerated sludge holding tank. Effluent from the secondary clarifier flows through a series of ultraviolent light banks. After disinfection, the effluent flows through a Parshall flume and is discharged into Mill Creek.

10. **Sewage Sludge Use or Disposal:** A VPDES Sewage Sludge Permit Application Form was submitted for this facility to address disposal of sewage sludge from the wastewater treatment facility. Sludge is aerobically digested and then dewatered on a portable belt filter press. The dewater sludge is transported to the Shawsville WWTP for further treatment (blending with sludge from the Shawsville, and Elliston-Lafayette WWTPs). The blended sludge is land applied under Shawsville's VPDES permit (VA0024031).

11. **Discharge Location Description:** A USGS topographic map which indicates the discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment D**. The latitude and longitude of the discharge are N 37°3'23", E 80°26'39".

Name of Topo: Riner Number: 081C

12. **Material Storage:** Lime is stored in a building onsite.

13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, STORET data, and any other biological and/or chemical data, etc.) are listed below.

Flow frequencies for the receiving stream were recalculated. DEQ conducted several flow measurements just upstream of the outfall at Riner WWTP. The measurements and the same day daily mean values from a continuous record gauge upstream of the discharge point on the South Fork of the Roanoke River near Shawsville, Virginia were plotted on a logarithmic graph and the associated flow frequencies above the discharge point were determined from the graph. Critical stream flow values are lower than the 2003 reissuance permit. **Attachment A** contains a copy of the flow frequency determination memorandum.

The nearest upstream STORET monitoring station (9-MLC005.44) is one-quarter mile above the discharge. The closest downstream monitoring station is 9 MLC002.74, almost two and one-half miles below the discharge. The 90th percentile pH, 90th percentile temperature, and hardness values were calculated from the upstream monitoring station (9-MLC005.44).

Riner WWTP discharges into the New River/East River Watershed (VAW-N21R) as described in the 2004 305(b) DEQ Watershed Summary Report (**Attachment E**). The 2004 303(d) report lists 15.27 miles of Mill Creek as impaired for not supporting the swimmable goal of the Clean Water Act. The segment extends from the mouth of Mill Creek on Meadow Creek (river mile 0.00) to river mile 15.27 and includes Poplar Branch and two unnamed tributaries. The impairment is caused by exceedances of the fecal coliform criteria for the stream. The impairment source is listed as Nonpoint Source – Agriculture/Wildlife/Domestic Septage.

14. **Antidegradation Review and Comments:** Tier I ____ Tier II ___X__ Tier III _____

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. The New River is not listed as a public water supply in the segment where the discharge is located. Mill Creek in this segment (VAW-N21R) is listed on Part I of the 303(d) list for exceedance of water quality criteria for E. coli. However, according to Agency guidance, the E. coli bacteria criteria should not be used relative to establishment of the antidegradation tier. There are no pollutant data that indicate that the water quality of the stream is not better than the water quality standards. Therefore, this segment of Mill Creek is classified as a Tier II water, and no significant degradation of existing quality is allowed.

For purposes of aquatic life protection in Tier II waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. The antidegradation baselines for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:
"WQS" = Numeric criterion listed in 9 VAC 25-260-00 et seq. for the parameter analyzed
"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

When applied, these "antidegradation baselines" become the new water quality criteria in Tier II waters, and effluent limits must be written to maintain the antidegradation baselines for each pollutant. Antidegradation baselines have been calculated as described above and included in **Attachment G**.

This facility was on-line before November 28, 1975 prior to the establishment of the antidegradation policy in the Clean Water Act. So, antidegradation had not been applied to the old 0.035 MGD facility. In the summer of 2000, the facility was upgraded to 0.10 MGD. Antidegradation requirements apply to the upgraded facility and have been applied to this permit reissuance. For this facility, the existing water quality is defined as the water quality prior to the discharge from the 0.10 MGD facility. The antidegradation review was conducted as described in Guidance Memorandum 00-2011, and complies with the antidegradation policy contained in Virginia's Water Quality Standards. The permit limits are in compliance with antidegradation requirements set forth in 9 VAC 25-260-30.

15. **Site Inspection:** Date: 4/25/08 Performed by: Becky L. France
Attachment C contains a copy of the site inspection memorandum.

16. **Effluent Screening and Limitation Development:** DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq.). Wasteload allocations (WLAs) are calculated for those parameters for which the

state of Virginia has established water quality criteria. Refer to **Attachment G** for the antidegradation wasteload allocation spreadsheet and effluent limit calculations. See **Table II** on pages 16-17 for a summary of limits and monitoring requirements.

A. **Mixing Zone**

The MIXER program was run to determine the percentage of the receiving stream flow that could be used in the antidegradation wasteload allocation calculations. The program output indicated that 100 percent of the 7Q10 and 1Q10 may be used for calculating acute and chronic antidegradation wasteload allocations (AWLAs) for the facility. A copy of the printout from the MIXER run is enclosed in **Attachment E**.

B. **Effluent Limitations for Conventional Pollutants**

Flow -- The permitted design flow of 0.10 MGD for this facility is taken from the previous permit and the application for the reissuance. In accordance with the VPDES Permit Manual, flow is to be continuously measured.

pH -- The pH limits of 6.0 S.U. minimum and 9.0 S.U. maximum have been continued from the previous permit. These limits are based upon the water quality criteria in 9 VAC 25-260-50 for Class IV receiving waters and are in accordance with federal technology-based guidelines, 40 CFR Part 133, for secondary treatment. Grab samples shall continue to be collected once per day.

Total Suspended Solids (TSS) -- TSS are technology-based requirements for municipal dischargers with secondary treatment required in accordance with 40 CFR Part 133. These limits of 30 mg/L (11 kg/d) monthly average and 45 mg/L (17 kg/d) weekly average shall continue from the previous permit. Four hour composite samples shall continue to be collected once per week.

Biochemical Oxygen Demand (BOD_5), Dissolved Oxygen (DO), Total Kjeldahl Nitrogen (TKN) -- The 1980 New River Basin Water Quality Management Plan (WQMP) reported results from modeling on Mill Creek that demonstrated the creek could assimilate 9.8 kg/d of BOD_5. At the current plant design flow of 0.10 MGD, this equates to a monthly average of 26 mg/L BOD_5 and TSS are technology-based requirements for municipal dischargers with secondary treatment required in accordance with 40 CFR Part 133.

The downstream dissolved oxygen existing condition prior to the upgrade to the 0.10 MGD facility was calculated using the Regional Water Quality Model. The average effluent dissolved oxygen effluent (6.0 mg/L) from one year of plant performance records, a BOD_5 of 30 mg/L, and a TKN of 5 mg/L were entered into the model. The model predicted a minimum instream dissolved oxygen concentration of 6.0 mg/L. In accordance with antidegradation policy, a decline of more than 0.20 mg/L below this existing concentration is not allowed.

For this reissuance, the Regional Water Quality Model for Free Flowing Streams (Version 4.0) was run for the expanded 0.10 MGD facility with revised temperature and flow values. An initial DO concentration of 7 mg/L, a TKN value of 5.1 mg/L, and a BOD_5 of 20 mg/L were used in the model input. The model predicted a DO sag to 5.728 mg/L. This sag is 0.272 mg/L below the existing condition of 6.0 mg/L. So, these effluent concentrations violate the antidegradation policy. When the input BOD_5 concentration was decreased to 19 mg/L the model predicted a DO sag to 5.83 mg/L. This value is 0.17 mg/L below the existing condition of 6.0 mg/L. These model inputs comply with antidegradation requirements.

So, the current minimum limit of 7 mg/L for DO will be continued in the permit. Dissolved oxygen shall continue to be monitored 1/day via grab samples. The revised BOD_5 limitations of 19 mg/L (7 kg/d) monthly average and 28 mg/L (11 kg/d) weekly average have been included in the permit.

TKN concentration limitations of 5.0 mg/L monthly average and 7.5 mg/L weekly average have been continued in the permit until the ammonia limits become effective. The loading limits of 1900 g/day monthly average and 2800 g/day weekly average have been revised to include only whole numbers. This change is in accordance with Guidance Memo 06-2016 which specifies that loading limits should be given in whole numbers. When the ammonia limitations become effective, the TKN limitations for June through December will be discontinued.

The Regional Water Quality Model predicts that a TKN of 5.1 mg/L will be adequate to protect water quality. Assuming 3.0 mg/L to be refractory organic compounds that will not undergo biological decay (as suggested in the regional water quality model documentation), an ammonia limit of 2.1 mg/L will ensure that the TKN limitation is met. Therefore, the ammonia limits will ensure compliance with the 5.1 mg/L TKN input in the model during the months of June through December. For the months of January through May, a TKN limit of 5.1 mg/L is more stringent than the monthly average ammonia limit, so TKN limits of 5.1 mg/L (1900 g/day) monthly average and 7.6 mg/L (2900 g/d) weekly average have been included in the permit for these months.

Backsliding to include less stringent TKN limit requirements is allowed because new stream flow and temperature information has been used in this new model run that was not available at the time of the previous reissuance. This new information exemption to backsliding is allowed in accordance with 9 VAC 25-31-220 L2.a of the VPDES Permit Regulation.

Total Suspended Solids (TSS) -- TSS limits are technology-based requirements for municipal dischargers of secondary treatment required in accordance with 40 CFR Part 133. These limits of 30 mg/L (11 kg/d) monthly average and 45 mg/L (17 kg/d) weekly average are the same as the previous permit. Grab samples shall continue to be collected once per week.

E. coli -- On January 15, 2003, new E. coli criteria became effective. The fecal coliform limitation has been discontinued because E. coli is a subset of fecal coliform, and a monthly geometric average E. coli limitation is more stringent than the fecal coliform limitation in the previous permit. The water quality criterion for E. coli (126 cfu/100 mL monthly average) has been applied at the end of the discharge pipe. Grab samples shall be collected once per week between 10 AM and 4 PM. If the facility chooses chlorine as the disinfection method, the E. coli monitoring frequency shall be 2/month (at least 7 days apart). A TMDL report indicated that a fecal coliform limit of 200 cfu/100 mL will ensure compliance with the fecal coliform wasteload alllocation for Mill Creek. So, the E. coli limitation will also ensure compliance with the TMDL for Mill Creek.

C. **Effluent Limitation Evaluation for Toxic Pollutants**

In addition to the standard limitations, the discharge must be evaluated to determine whether there is a reasonable potential for the effluent to violate the water quality standards (WQSs) adopted by the State Water Control Board (9 VAC 25-260 et. seq). Toxic pollutant data submitted with the application were above the quantification levels for ammonia as nitrogen, dissolved copper, dissolved silver, and dissolved zinc. These data are summarized in **Attachment F**.

The water quality criteria and AWLAs for these parameters were calculated and are included in the spreadsheet in **Attachment G**. The acute and chronic AWLAs and the effluent data for dissolved silver were used as input in the Agency's STATS program to determine if limits were necessary for silver. The program output indicates that a permit limit is not necessary for silver. Copies of the STATS program results are included in **Attachment G**.

Ammonia as Nitrogen -- The need for an ammonia limit has been reevaluated using revised water quality criteria. The acute and chronic water quality criteria and antidegradation wasteload allocations were calculated and are included in the spreadsheet in **Attachment F**. As recommended in Guidance Memorandum 00-2011, the antidegradation wasteload allocations and a default ammonia concentration of 9 mg/L were input into the STATS program. The STATS program output indicates that for January through May ammonia as nitrogen permit limits of 3.2 mg/L monthly average and 4.6 mg/L weekly average are needed. Assuming 3.0 mg/L to be refractory organic compounds that will not undergo biological decay (as suggested in the regional water quality model documentation), an ammonia limit of 3.2 mg/L is equivalent to a TKN limit of 6.2 mg/L. Since, the TKN limits of 5.1 mg/L monthly average and 7.6 mg/L weekly average discussed above are more stringent than the output from the STATS program for January through May, ammonia limits will not be need for these months. The STATS program output indicates that for June through December, ammonia as nitrogen permit limits of 1.8 mg/L monthly average and 2.6 mg/L weekly average are needed. See **Attachment F** for the STATS program outputs. A four-year schedule of

compliance has been included to allow the permittee time to meet the ammonia as nitrogen limitations. In accordance with the VPDES Permit Manual, grab samples shall be taken once per week once the limitations become effective.

Copper, Total Recoverable -- Dissolved copper data collected during the permit term, and the acute and chronic AWLAs were entered into the STATS program to determine if limitations are needed. The permittee collected one upstream sample for dissolved copper, and this data was included as the background concentration for the AWLAs. The STATS program output indicates that total recoverable copper limitations of 14 µg/L monthly average and 14 µg/L weekly average are needed. See **Attachment F** for the STATS program output. A four-year schedule of compliance has been included to allow the permittee time to meet the copper limitations. In accordance with the VPDES Permit Manual, grab samples shall be taken once per month once the limitations become effective.

Temperature -- Daily temperature monitoring is being required in the reissued permit. These data will be reported as a maximum daily average for the purposes of calculating the 90th percentile effluent temperature and calibrating the Regional Water Quality Model. The 90th percentile temperature is used in the WLA spreadsheet calculations. The temperature water quality criteria as per 9 VAC 25-260-50 for this Class IV receiving stream is 29 °C.

Total Residual Chlorine (TRC) -- The facility uses UV disinfection as the disinfection method. In the event that the facility decides to use TRC as an alternative method of disinfection methods, TRC limits have been established to avoid any future modifications to the permit. In the absence of TRC data, one data value, equal to the QL, was assumed to exist. This methodology is similar to that discussed in Guidance Memorandum 00-2011 for ammonia. Antidegradation AWLAs have been established for TRC to protect the receiving stream from degradation. Since no data exist for the Tier II receiving stream, the baseline is equal to 25 percent of the criterion.

The revised acute and chronic AWLAs for TRC were input into the STATS program to calculate appropriate limits. Based on the Agency's STATS program, permit limits of 0.004 mg/L monthly average and 0.005 mg/L weekly average are required. Grab samples are required once per day. See **Attachment F** for the AWLA spreadsheet and STATS program output.

Zinc, Total Recoverable -- Dissolved zinc data collected during the permit term, and the acute and chronic AWLAs were entered into the STATS program to determine if limitations are needed. The permittee collected one upstream sample for dissolved zinc, and this data was included as the background concentration for the AWLAs. The STATS program output indicates that total recoverable zinc limitations of 110 µg/L monthly average and 110 µg/L maximum weekly average are needed. See **Attachment F** for the STATS program output. A four-year schedule of compliance has been included to allow the permittee time to meet the zinc limitations. In accordance with the VPDES

Permit Manual, grab samples shall be taken once per month once the limitations become effective.

17. **Basis for Sludge Use and Disposal Requirements:** Since the facility hauls sludge to a municipal wastewater treatment plant for further treatment and land application, there are no sludge limits or monitoring requirements.

18. **Antibacksliding Statement:** The 2003 permit contained TKN limitations but no ammonia limits. For this reissuance, ammonia limitations have been added. Compliance with the ammonia as nitrogen limitations during the months of June through December is expected to ensure compliance with the TKN model input for this reissuance. During the months of January through May, less stringent TKN limits have been added. Backsliding on the TKN limit requirements is allowed because new stream flow and temperature information has been used in this new model run that was not available at the time of the previous reissuance. This new information exemption to backsliding is allowed in accordance with 9 VAC 25-31-220 L2.a of the VPDES Permit Regulation. There are no other limitations less stringent than the previous permit. The permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.

19. **Compliance Schedules:** In accordance with 9 VAC 25-31-250 A3, a compliance schedule has been added to the permit as Part I.C to allow the permittee four years to comply with ammonia as nitrogen, total recoverable copper, and total recoverable zinc limitations.

20. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. **Additional Total Residual Chlorine (TRC) Limitations and Monitoring Requirements (Part I.B)**

Rationale: Should the permittee elect to disinfect by chlorine rather than UV light, this condition establishes TRC concentration limits after chlorine contact and final TRC effluent limits and monitoring requirements. This condition is in accordance with chlorine criteria in 9 VAC 25-260-140 of the VPDES Permit Regulation. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. These requirements ensure proper operation of chlorination equipment to maintain adequate disinfection.

B. **Schedule of Compliance (Part I.C)**

Rationale: In accordance with 9 VAC 25-31-250 A3, a schedule of compliance has been added to allow the permittee time to meet ammonia, copper, and zinc limitations.

C. **Compliance Reporting under Part I.A and I.B (Part I.D.1)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR Part 130, Water Quality Planning and Management, Subpart 130.4. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

D. **95% Capacity Reopener (Part I.D.2)**

Rationale: This condition requires that the permittee address problems resulting from high influent flows, in a timely fashion, to avoid non-compliance and water quality problems from plant overloading. This requirement is contained in 9 VAC 25-31-200 B2 of the VPDES Permit Regulations.

E. **Indirect Dischargers (Part I.D.3)**

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-200 B1 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

F. **CTC, CTO Requirement (Part I.D.4)**

Rationale: This condition is required by Code of Virginia § 62.1-44.19 and the Sewage Collection and Treatment Regulations, 9 VAC 25-790.

G. **Operations and Maintenance Manual Requirement (Part I.D.5)**

Rationale: Submittal of the manual to DEQ for approval is required by the VPDES Permit Regulation, 9 VAC 25-31-190 E to provide an opportunity for review of current and proposed operations of the facility.

H. **Licensed Operator Requirement (Part I.D.6)**

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 D and the Code of Virginia 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators, require licensure of operators. A Class III operator is required for this facility.

I. **Reliability Class (Part I.D.7)**

Rationale: A Reliability Class II has been assigned to this facility. Reliability class designations are required by Sewage Collection and Treatment Regulations, 9 VAC 25-790-70 for all municipal facilities.

J. **Sludge Reopener (Part I.D.8)**

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage.

K. **Sludge Use and Disposal (Part I.D.9)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B2; and 420 and 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the Department of Health's Biosolids Use Regulations, 12 VAC 5-585-10 et seq. This special condition, in accordance with Guidance Memorandum No. 97-004, clarifies that the Sludge Management Plan approved with the reissuance of this permit is an enforceable condition of the permit.

L. **Total Maximum Daily Load (TMDL) Reopener (Part I.D.10)**

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

M. **Water Quality Criteria Monitoring (Part I.D.11)**

Rationale: State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

Water quality criteria monitoring for the 0.10 MGD facility was required during a previous permit term. **Attachment F** contains the results of this monitoring. Since the

collection of these data in 2003, water quality criteria have been added for additional parameters. So, monitoring is required for the additional parameters not previously monitored. Laboratory data summary sheets and chain of custody sheets shall be submitted with Attachment A of the permit to document the laboratory methods used, practicable quantification levels, field collection, and preservation methods.

N. **Conditions Applicable to All VPDES Permits (Part II)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. **Changes to the Permit:**

A. **The following special conditions have been deleted from the permit:**

1. The Bacterial Effluent Limitations and Monitoring Requirements Special Condition (Part I.C) has been removed because the facility bacterial data required by this special condition have been submitted and no further data are needed.

2. The Significant Discharger Survey (Part I.D) has been removed because no significant industrial dischargers have been identified, and the permittee will be required to notify DEQ of the introduction of new pollutants from indirect dischargers (Part I.D.3).

B. **Special conditions that have been modified from the previous permit are listed below: (The referenced permit sections are for the new permit.)**

1. A Compliance Reporting under Part I.A and I.B Special Condition (Part I.D.1) has been revised to include information about significant figures.

2. The Operations and Maintenance Manual Special Condition (Part I.D.5) has been revised in accordance with the VPDES Permit Manual.

3. The Water Quality Criteria Monitoring Special Condition (Part I.D.11) has been revised to reflect new water quality standards.

C. **The following new special condition added to the permit are listed below:**

1. The Additional Total Residual Chlorine Limitations and Monitoring Requirements Special Condition (Part I.B) has been added to include TRC limits that effective if the facility changes to chlorine disinfection.

2. A Schedule of Compliance (Part I.C) has been added to allow the permittee time to meet the ammonia limitations.

3. The CTC, CTO Requirement (Part I.D.3) has been added in accordance with the VPDES Permit Manual.

4. A Total Maximum Daily Load (TMDL) Special Condition has been added as Part I.D.10 to allow opening of the permit if necessary to comply with any applicable TMDL for the receiving stream.

D. **Permit Limits and Monitoring Requirements:** See Table III on page 18-19 for details on changes to the effluent limits and monitoring requirements.

22. **Variances/Alternate Limits or Conditions:** No variances or alternate limits or conditions are included in this permit. The permittee requested that the 4-hour composite data for TSS and BOD_5 collected during the permit term be used on the application in lieu of 24-hour composite samples. A waiver was requested to allow one pollutant scan instead of 3 samples for ammonia as nitrogen, nitrate + nitrite, oil and grease, and dissolved solids. Additionally, it was requested that one pollutant scan be allowed from the aerobic sludge digester to test for arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc. These waivers were consistent with current permit requirements, and therefore they were granted.

23. **Regulation of Treatment Works Users:** The VPDES Permit Regulation, 9 VAC 25-31-280 B9, requires that every permit issued to a treatment works owned by a person other than a state or municipality provide an explanation of the Board's decision on the regulation of users. Montgomery County, a municipality, owns this treatment works; therefore this regulation does not apply. The permit requires that the facility submit a Significant Industrial Survey (Part I.E).

24. **Public Notice Information required by 9 VAC 25-31-290 D:**

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Becky L. France at:

Virginia DEQ, West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
blfrance@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the DEQ will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

25. **303(d) Listed Segments (TMDL):** This facility discharges directly to the Mill Creek. The stream segment receiving the effluent is listed for fecal coliform in Part I of the 2006 303(d) list. The Total Maximum Daily Load (TMDL) report entitled "Fecal Coliform TMDL for Mill Creek Watershed, Virginia" was approved by EPA on June 5, 2002. It contains a wasteload allocation for this discharge of 2.62×10^{11} cfu/year, equating to a 30-day geometric mean of 200 colonies per 100 mL in the discharge. This permit has a more stringent E. coli limit that is in compliance with the TMDL. **Attachment E contains** excerpts from the 303(d) report and TMDL report. The full TMDL report may be found on the web at www.deq.virginia.gov/tmdl/apptmdls/newrvr/mill.pdf.

26. **Additional Comments:**

A. **Reduced Effluent Monitoring:** In accordance with Guidance Memorandum 98-2005, all permit applications received after May 4, 1998, are considered for reduction in effluent monitoring frequency. Only facilities having exemplary operations that consistently meet permit requirements may qualify for reduced monitoring. To qualify for consideration of reduced monitoring requirements, the facility should not have been issued any Warning Letters, Notices of Unsatisfactory Laboratory Compliance, Letter of Noncompliance (LON) or Notices of Violation (NOV), or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

The facility received the following Warning Letters within the past three years:

Warning Letter No. W2008-05-W-1003	incomplete VPDES permit application
Warning Letter No. W2008-04-W-1005	E. coli exceedance
Warning Letter No. W2008-03-W-1002	E. coli exceedance
Warning Letter No. W2008-04-W-1001	E. coli exceedance
Warning Letter No. W2008-04-W-1001	E. coli exceedance
Warning Letter No. W2006-11-W-1006	E. coli exceedance

The facility does not meet the criteria discussed above and therefore is not eligible for reduced monitoring.

B. **Previous Board Action:** None

C. **Staff Comments:** The discharge is not controversial, and is conformance with the existing planning document for the area. The permit is being reissued for a period of less than five years to even out the DEQ staff permitting workload.

On August 15, 2008 the permittee submitted clean metals effluent sampling data for copper and zinc. Upstream dissolved copper and zinc data were also submitted. The Fact Sheet was modified on August 18, 2008 to include these data. Discussion with the permittee revealed that pH data collected during the last 12 months were representative of current operations. Data collected during the first part of the permit term were not representative of current operation, so these data were excluded from the 90th percentile pH calculation. These amended ALWAs resulted in revisions to the TKN and ammonia limits.

D. **Public Comments:** No public comments were received during the public comment period.

E. **Tables:**

Table I	Discharge Description (Page 2)
Table II	Basis for Monitoring Requirements (Pages 16-17)
Table III	Permit Processing Change Sheet (Pages 18-19)

F. **Attachments**

A. Flow Frequency Memorandum
B. Wastewater Schematic
C. Site Inspection Report
D. USGS Topographic Map
E. Ambient Water Quality Information
   - STORET Data (Station 9-MLC005.44)
   - 2006 Impaired Waters Summary (Excerpt)
   - 2004 Integrated Report Watershed Assessment Report Unit Summary (Excerpt)
   - 1976 New River Basin Comprehensive Water Resources Plan (Excerpt)
   - 1980 New River Water Quality Management Plan (Excerpt)
   - Fecal Coliform TMDL for Mill Creek Watershed (Excerpt)

F. Effluent Data
G. Wasteload and Limit Calculations
   - Mixing Zone Calculations (MIXER 2.1)
   - Antidegradation Wasteload Allocation Spreadsheet
   - STATS Program Results (ammonia, copper, TRC, zinc)

H. Diffuser Model Calculations
I. Public Notice
J. EPA Checksheet

Table II-1
BASIS FOR LIMITATIONS – MUNICIPAL

( ) Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.10 MGD

Effective Dates - From: Compliance with Schedule
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	Recorded
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD_5	3	19 mg/L 7 kg/d	28 mg/L 11 kg/d	NA	NA	1/Week	4 HC
Total Suspended Solids	1	30 mg/L 11 kg/d	45 mg/L 17 kg/d	NA	NA	1/Week	4 HC
Dissolved Oxygen	2,3	NA	NA	7.0 mg/L	NA	1/Day	Grab
Temperature	2	NA	NA	NA	NL °C	1/Day	Grab
Total Kjeldahl Nitrogen (Jan. - May)	2,3	5.1 mg/L 1900 g/d	7.6 mg/L 2900 g/d	NA	NA	1/Week	4 HC
Ammonia as Nitrogen (June - Dec.)	2	1.8 mg/L	2.6 mg/L	NA	NA	1/Week	4HC
Copper, Total Recoverable	2	14 µg/L	14 µg/L	NA	NA	1/Month	Grab
Zinc, Total Recoverable	2	110 µg/L	110 µg/L	NA	NA	1/Month	Grab
E. coli	2	126 cfu/ 100 mL	NA	NA	NA	1/Week	Grab

NA = Not Applicable
NL = No Limitations; monitoring only
4HC= 4 hour composite

The basis for the limitations codes are:
1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Regional Water Quality Model

Table II-2
BASIS FOR LIMITATIONS – MUNICIPAL

(X) Interim Limitations
( ) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.10 MGD

Effective Dates - From: Effective Date
To: Compliance with Schedule

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	Recorded
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD_5	3	19 mg/L 7 kg/d	28 mg/L 11 kg/d	NA	NA	1/Week	4 HC
Total Suspended Solids	1	30 mg/L 11 kg/d	45 mg/L 17 kg/d	NA	NA	1/Week	4 HC
Dissolved Oxygen	2,3	NA	NA	7.0 mg/L	NA	1/Day	Grab
Total Kjeldahl Nitrogen	3	5.0 mg/L 1900 g/d	7.5 mg/L 2800 g/d	NA	NA	1/Week	Grab
Temperature	2	NA	NA	NA	NL °C	1/Day	Grab
E. coli	2	126 cfu/ 100 mL	NA	NA	NA	1/Week	Grab

NA = Not Applicable
NL = No Limitations; monitoring only
4HC= 4 hour composite

The basis for the limitations codes are:
1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Regional Water Quality Model

Table III-1
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	BOD_5			20 mg/L (7.5 kg/d) monthly average; 30 mg/L (11 kg/d) weekly average	19 mg/L (7 kg/d) monthly average; 28 mg/L (11 kg/d) weekly average	Revised temperature data have been entered into the water quality model, and the model output indicates that more stringent limits are needed for BOD_5.	7/14/08
001	Temperature	NA	1/Day			Effluent temperature monitoring required to provide data used in calculation of wasteload allocations and water quality model.	7/14/08
001	TKN (final limits page)	1Week	NA	5.0 mg/L (1.9 kg/d) monthly average; 7.5 mg/L (2 kg/d) weekly average	5.1 mg/L (1900 g/d) monthly average; 7.6 mg/L (2900 g/d) weekly average	TKN limitations and monitoring have been removed for the months of January through May because ammonia limits will ensure compliance with the TKN limitations required by the Regional Water Quality Model. For the months of June through December TKN are more stringent and have been included as per the Regional Water Quality Model output. TKN backsliding is allowed because new stream flow and temperature data were entered into the model.	8/18/08
001	TKN (interim limits page)	1Week	NA	5.0 mg/L (1.9 kg/d) monthly average; 7.5 mg/L (2.8 kg/d) weekly average	5.0 mg/L (1900 g/d) monthly average; 7.5 mg/L (2800 g/d) weekly average	The TKN loading limits were rewritten in whole numbers in accordance with Guidance Memorandum 06-2016 which specifies that loading limits should be listed in whole numbers.	8/18/08
001	Ammonia as Nitrogen (June - Dec.)	NA	1/Week	NA	1.8 mg/L monthly average; 2.6 mg/L weekly average	STATS program indicated the need for ammonia limitations.	8/18/08

Table III-2
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Copper, Total Recoverable	NA	1/Month	NA	14 µg/L monthly average; 14 µg/L weekly average	STATS program indicated the need for copper limitations.	8/18/08
001	Zinc, Total Recoverable	NA	1/Month	NA	110 µg/L monthly average; 110 µg/L weekly average	STATS program indicated the need for zinc limitations.	7/14/08
001	E. coli	NA	1/Week	NA	126 N/CML geometric mean	The fecal coliform limit has been replaced with more stringent E. coli limits.	7/14/08
001	Fecal Coliform	1/Week	NA	200 N/ 100 mL geometric mean	NA	The fecal coliform limit has been replaced with more stringent E. coli limits.	7/14/08
001	Total Residual Chlorine (TRC) (Part I.B – applicable if TRC used for disinfection)	NA	1/Day	NA	0.004 mg/L monthly average, 0.005 mg/L weekly average	TRC limitations have been added and apply if the facility changes to chlorine as disinfection method. When chlorine is the disinfection methods, limitations are needed. STATS program output indicated the limits needed for TRC.	7/14/08

Attachment A

Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
3019 Peters Creek Road, Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Riner WWTP – (VA0024040)

TO: Permit File

FROM: Becky L. France, Environmental Engineer Senior BLF

DATE: April 9, 2008

COPIES:

This memorandum supersedes the July 22, 1998, memorandum from Paul E. Herman concerning the subject VPDES permit.

Riner WWTP discharges to Mill Creek near Riner, Virginia. Stream flow frequencies are required at this site to develop effluent limitations for the VPDES permit.

DEQ conducted several flow measurements on Mill Creek from 1993 to 1997. The measurements were made just upstream of the Riner WWTP discharge. The measurements correlated very well with the same day daily mean values from the downstream continuous record gauge on the South Fork of the Roanoke River near Shawsville, Virginia #02053800. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gauge were plotted on the regression line and the associated flow frequencies at the measurement site were calculated. The values for the measurement site were projected to the discharge point using proportional drainage areas.

This analysis assumes there are no significant discharges, withdrawals, or springs influencing the flow in Mill Creek upstream of the discharge point. The high flows are January through May. Flow frequencies for the reference gauge, the measurement site, and the discharge point are listed on the attached tables.

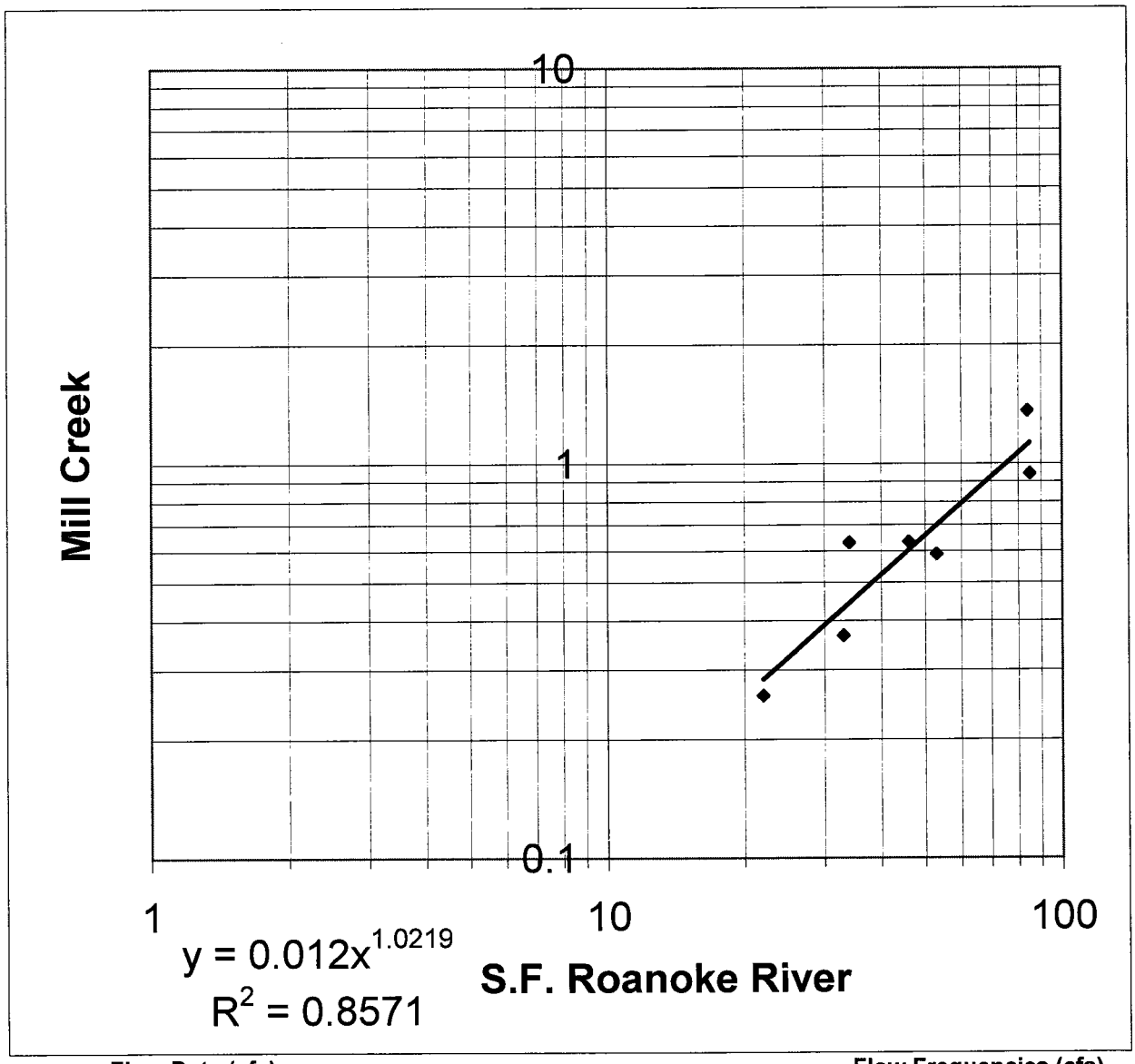
Reference Gauge (data from 1961 to 2003)
S.F. Roanoke River near Shawsville, VA (#02053800)

	Drainage Area [mi^2] =		110	mi^2	
	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	12	7.8	High Flow 1Q10 =	22	14
7Q10 =	13	8.4	High Flow 7Q10 =	26	17
30Q5 =	20	13	High Flow 30Q10=	37	24
30Q10=	17	11	HM =	53	34

Flow frequencies from Regression Analysis above Riner WWTP
Mill Creek at Riner, VA (#03170100)

	Drainage Area [mi^2] =		**2.12**	**mi^2**	
	ft^3/s	**MGD**		**ft^3/s**	**MGD**
1Q10 =	**0.15**	**0.10**	**High Flow 1Q10 =**	**0.28**	**0.18**
7Q10 =	**0.17**	**0.11**	**High Flow 7Q10 =**	**0.34**	**0.22**
30Q5 =	**0.26**	**0.17**	**High Flow 30Q10**	**0.48**	**0.31**
30Q10=	**0.22**	**0.14**	**HM =**	**0.69**	**0.45**

Mill Creek above Riner, VA (#03170100)
vs S.F. Roanoke River, VA (#02053800)



Flow Data (cfs)

Date	SF Roanoke	Mill Creek
8/30/1993	33	0.366
5/23/1994	85	0.941
9/23/1994	46	0.633
8/7/1995	34	0.63
9/26/1996	84	1.36
6/30/1997	53	0.589
9/8/1997	22	0.258

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.906179
R Square	0.82116
Adjusted R Squa	0.785392
Standard Error	0.171275
Observations	7

Flow Frequencies (cfs)

SF Roanoke		Mill Creek
12	1Q10	0.152
13	7Q10	0.165
20	30Q5	0.256
17	30Q10	0.217
22	HF 1Q10	0.282
26	HF 7Q10	0.335
53	HM	0.694
37	HF30Q10	0.481
110 mi^2	DA	2.12 mi^2
	Jan-May	

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.906179
R Square	0.82116
Adjusted R	0.785392
Standard E	0.171275
Observatio	7

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	1	0.673474	0.673474	22.95794	0.004921
Residual	5	0.146676	0.029335		
Total	6	0.82015			

	Coefficients	*tandard Erı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Ipper 95.0%*
Intercept	-0.003048	0.157028	-0.019411	0.985264	-0.4067	0.400603	-0.4067	0.400603
X Variable	0.013441	0.002805	4.791445	0.004921	0.00623	0.020652	0.00623	0.020652

RESIDUAL OUTPUT

Observatior	*Predicted Y*	*Residuals*	*ıdard Residuals*
1	0.440496	-0.074496	-0.476461
2	1.139413	-0.198413	-1.269015
3	0.615225	0.017775	0.113686
4	0.453936	0.176064	1.126073
5	1.125972	0.234028	1.496801
6	0.70931	-0.12031	-0.769482
7	0.292648	-0.034648	-0.221601

Mill Creek at Riner, VA
Station ID No. 03170100
Lat 37 03'23", Long 80 26'38", NAD 83
Montgomery County

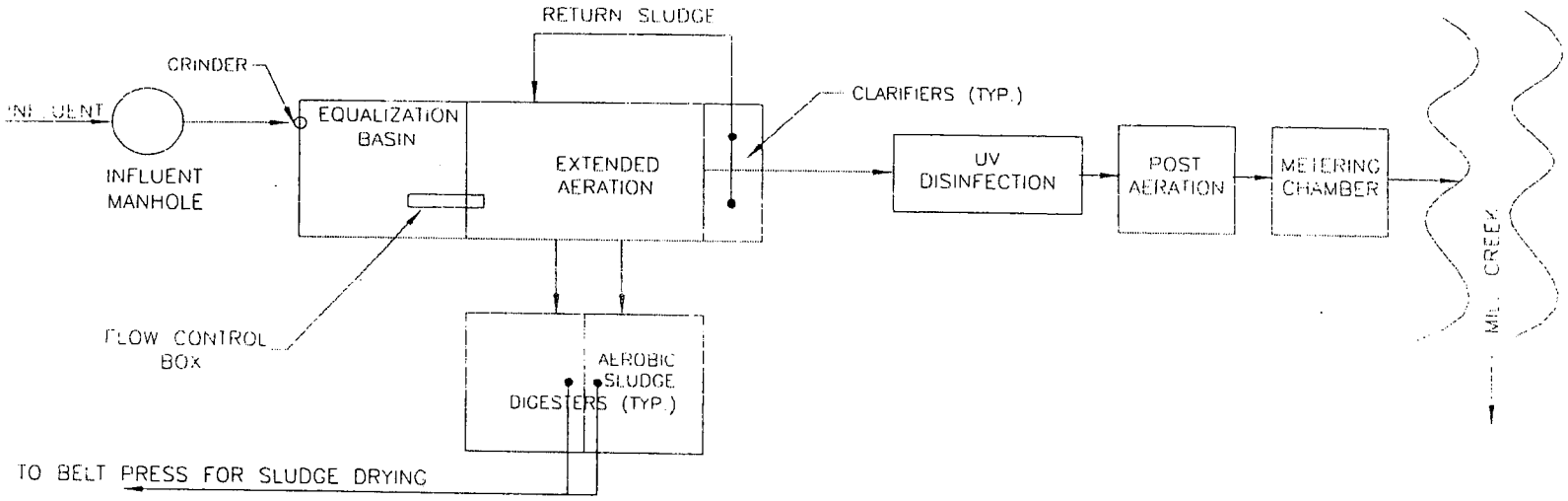
SITEID	RECORD	DATE	DISCH	QUAD	DAAREA
03170100	MQ, 1993-98	8/30/1993	0.366	Riner	2.12
03170100	MQ, 1993-98	5/23/1994	0.941	Riner	2.12
03170100	MQ, 1993-98	9/23/1994	0.633	Riner	2.12
03170100	MQ, 1993-98	8/7/1995	0.63	Riner	2.12
03170100	MQ, 1993-98	9/26/1996	1.36	Riner	2.12
03170100	MQ, 1993-98	6/30/1997	0.589	Riner	2.12
03170100	MQ, 1993-98	9/8/1997	0.258	Riner	2.12

South Fork Roanoke River at Shawsville, Va.
Station No. 02053800
Montgomery Country
Ironto Quad
Lat 37 08'24", Long 80 15'59", NAD 83
Roanoke River Basin

RECORD	DaArea	Harmean	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HFMTHS	Statperiod	YRSTRN
R, 1960-	110	53	37	26	22	20	17	13	12	8.7	JAN-MAY	1961-2003	2005

Attachment B

Wastewater Schematic



RINER WASTEWATER TREATMENT PLANT

FLOW DIAGRAM

FIGURE 1

ANDERSON AND ASSOCIATES, Inc.
Engineers
Surveyors
Planners

DRAWN	SCALE	DATE	DOCUMENT NO.
MGG	N.T.S.	31 JUL 00	13254-031

Attachment C

Site Inspection Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Site Inspection Report for Riner WWTP
Reissuance of VPDES Permit No. VA0024040

TO: Permit File

FROM: Becky L. France, Environmental Engineer Senior

CC: Samuel C. Hale, Environmental Inspector Supervisor

DATE: June 4, 2008

On April 25, 2008, a site inspection of the Riner WWTP was conducted. Mr. Bruce Jones, Water/Wastewater Supervisor and Mr. Ronald Akers, operator, were present at the inspection.

Familiarization with Plant Operations

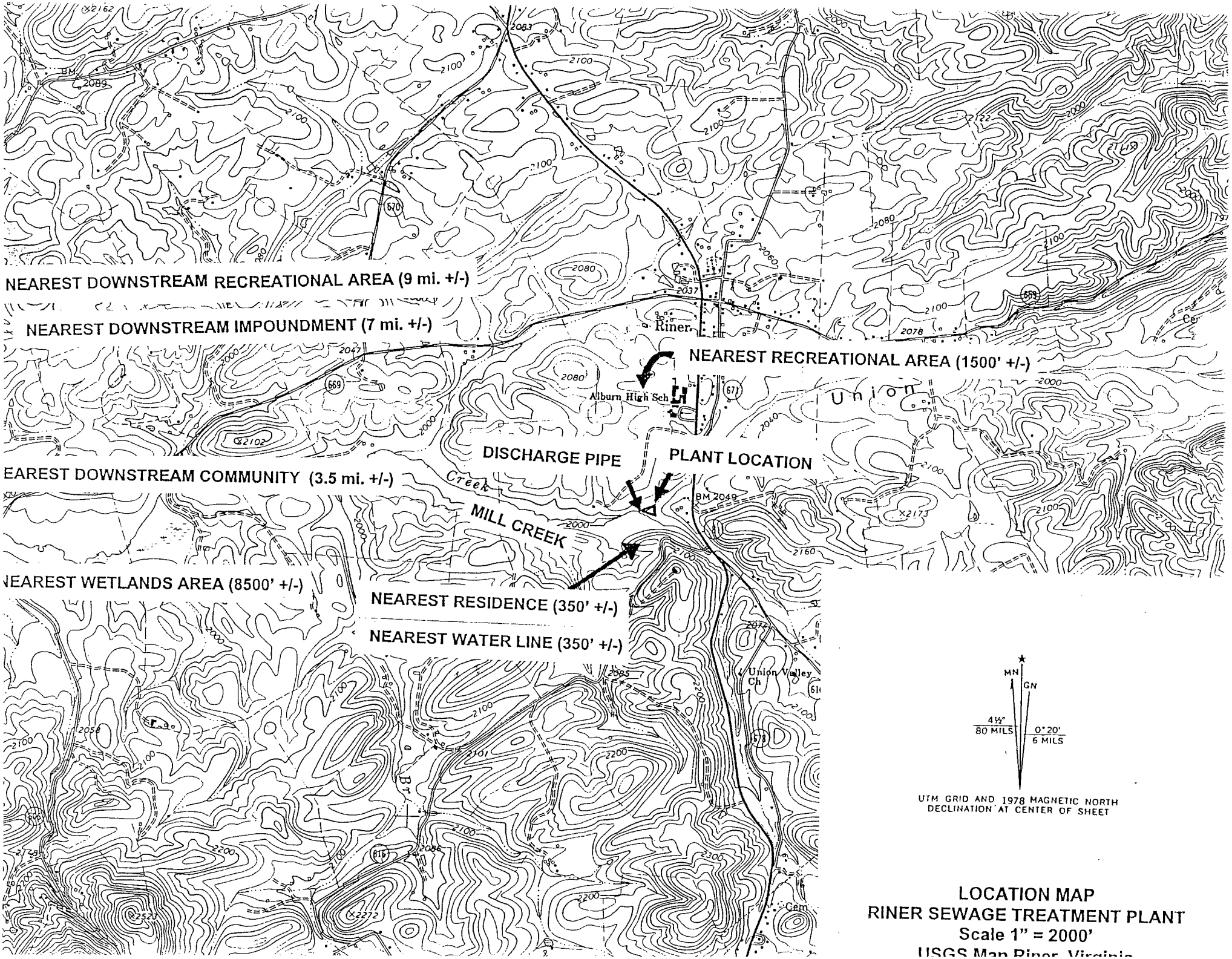
The Riner WWTP is a 0.10 MGD extended aeration package treatment plant with dual treatment trains. Each treatment train consists of comminutor, bar screen, 40,000 gallon equalization basin, aeration basin, clarifier, aerobic sludge digester, ultraviolent light banks, and Parshall flume. The facility is currently operating only one of the treatment trains with the exception that during periods of high flow wastewater is temporarily diverted into the second aeration basin.

Wastewater enters the plant from a 6-inch force main and flows through a comminutor chamber or manual bar screen channel. The influent is pumped into an aeration basin. At the time of the site visit, the wastewater had a chocolate color, and there was some foam floating on top. The wastewater is then routed to one of the clarifiers. At the time of the site visit, there was some wastewater in the second aeration basin and clarifier due to temporary routing during high flows. From the clarifier, the wastewater overflows the weir and enters a splitter box which divides the flow between two banks of ultraviolent lights. The facility had a second backup set of ultraviolent lights that was out of service at the time of the site visit. The ultraviolent lights consists of three banks of light with four modules for each bank. Each module has two lamps. The UV disinfection system is housed in a building with heat lamps due to difficulties with freezing temperatures in the winter. Following disinfection, the At the time of the site visit, one of the banks was not functioning. Disinfected effluent flows into a post aeration tank. The effluent then passes through a 3-inch Parshall flume with ultrasonic flow meter and is discharged to Mill Creek. There was no visible foam at the discharge point.

Sludge and solids from the clarifier are routed to two 15,000 gallon aerated digesters. At the time of the site visit, some of the aeration nozzles were not working and there was some accumulation of sludge in one end of a digester. Approximately twice per year, a portable belt press is brought to the plant to dewater the digesterd sludge. The dewatered sludge is hauled to the Shawsville WWTP where it is blended with sludge from the Shawsville WWTP and the Elliston-Lafayette WWTP. The blended sludge is land applied in accordance with the Shawsville WWTP VPDES permit.

Attachment D

USGS Topographic Map



LOCATION MAP
RINER SEWAGE TREATMENT PLANT
Scale 1" = 2000'
USGS Map Riner, Virginia

Attachment E

Ambient Water Quality Information

- STORET Data (Station 9-MLC005.44)
- 2006 Impaired Waters Report (Excerpt)
- 2004 Integrated Report Watershed Assessment Report Unit Summary (Excerpt)
- 1976 New River Basin Comprehensive Water Resources Plan (Excerpt)
- 1980 New River Water Quality Management Plan (Excerpt)
- Fecal Coliform TMDL for Mill Creek Watershed (Excerpt)

Watershed Code VAW-N21R
Station No. 9-MLC005.44

Collection Date Time	pH (S.U.)
2/3/1997 9:30	8.1
5/1/1997 11:00	8.2
9/25/1997 9:30	8
11/3/1997 9:30	8.2
2/9/1998 10:00	7.5
5/21/1998 10:30	8.1
8/13/1998 10:30	8.3
11/4/1998 10:30	8
2/3/1999 10:30	8.4
5/3/1999 11:00	8.5
7/28/1999 11:30	8
9/21/1999 12:30	8.2
11/29/1999 12:00	8.1
1/18/2000 12:30	8.3
3/13/2000 15:00	8
5/8/2000 12:30	8.7
7/11/2001 9:15	8.12
9/26/2001 10:15	8.2
11/5/2001 9:00	7.56
1/8/2002 9:00	8.29
3/21/2002 11:05	8.23
5/22/2002 12:10	8.04
6/6/2002 13:00	7.86
7/10/2002 10:00	7.61
11/20/2002 8:50	7.45
4/1/2003 10:50	7.8
1/9/2007 13:55	7.9
3/22/2007 13:40	8
5/2/2007 10:45	7.9
7/18/2007 14:20	8.1
9/11/2007 12:25	7.9
11/1/2007 12:50	7.8
1/16/2008 11:00	7.5
3/20/2008 12:15	7.5
5/12/2008 13:00	8.1

90th Percentile pH 8.3 S.U.
10th Percentile pH 7.5 S.U.

Watershed Code	VAW-N21R
Station No.	9-MLC005.44

Collection Date Time	Temp Celsius
2/3/1997 9:30	12.7
5/1/1997 11:00	13.8
9/25/1997 9:30	13
11/3/1997 9:30	10.3
2/9/1998 10:00	10.7
5/21/1998 10:30	16.5
8/13/1998 10:30	19.8
11/4/1998 10:30	10.5
2/3/1999 10:30	9.2
5/3/1999 11:00	13
7/28/1999 11:30	19
9/21/1999 12:30	18.5
11/29/1999 12:00	9.2
1/18/2000 12:30	3.4
3/13/2000 15:00	11.6
5/8/2000 12:30	18.6
7/11/2001 9:15	17.1
9/26/2001 10:15	10.8
11/5/2001 9:00	7.8
1/8/2002 9:00	0
3/21/2002 11:05	11.8
5/22/2002 12:10	13.8
6/6/2002 13:00	19.58
7/10/2002 10:00	18.05
11/20/2002 8:50	9.52
1/28/2003 12:30	6
4/1/2003 10:50	9.61
1/9/2007 13:55	8.2
3/22/2007 13:40	15.1
5/2/2007 10:45	15.2
7/18/2007 14:20	25.5
9/11/2007 12:25	19.8
11/1/2007 12:50	12.6
1/16/2008 11:00	1.4
3/20/2008 12:15	9
5/12/2008 13:00	11.7
5/22/2008 13:00	18

90th Percentile temperature	19.2 °C	
90th Percentile temperature	16.5 °C	(January - May)

Watershed Code	VAW-N21R
Station No.	9-MLC005.44

Collection Date Time	Hardness, Total (mg/L as $CaCO_3$)
1/10/1991 10:30	152
9/23/1991 10:45	236
2/2/1992 11:00	214
2/10/1992 11:00	223
5/6/1992 11:30	198
8/10/1992 11:30	240
5/3/1993 11:00	188
8/4/1993 11:30	238
11/4/1993 10:30	246
2/1/1994 10:30	178
8/2/1994 10:30	198
11/3/1994 10:30	234
2/21/1995 10:30	163
5/4/1995 10:30	202
7/31/1995 10:00	230
11/1/1995 13:30	229
2/8/1996 10:00	184
5/1/1996 11:00	160
8/1/1996 10:30	205
11/4/1996 10:30	217
2/3/1997 9:30	177.6
5/1/1997 11:00	170
9/25/1997 9:30	236
11/3/1997 9:30	214
2/9/1998 10:00	138
5/21/1998 10:30	184
8/13/1998 10:30	235
11/4/1998 10:30	237
2/3/1999 10:30	148
5/3/1999 11:00	218
7/28/1999 11:30	266
9/21/1999 12:30	248
11/29/1999 12:00	191
1/18/2000 12:30	207
3/13/2000 15:00	211
5/8/2000 12:30	177
7/11/2001 9:15	238
9/26/2001 10:15	239
11/5/2001 9:00	266
1/8/2002 9:00	177
3/21/2002 11:05	172
5/22/2002 12:10	199
7/10/2002 10:00	255
11/20/2002 8:50	197
1/28/2003 12:30	248
4/1/2003 10:50	189
5/29/2003 11:30	368

mean hardness	212	mg/L

*5/29/2003 15.9 mg/L assumed data was a typo; did not use in calculation of mean

New River Basin

Fact Sheet prepared for: Montgomery Co.*

Cause Group ID: **N21R-03-BAC** **Mill Creek, Poplar Branch, Mill Creek UTs (XDE & XDF)**

2006 TMDL Group Codes: 00132

Location: The upper limit begins at the headwaters of Mill Creek on the Riner Quad and extends downstream to the Mill Creek confluence with Meadow Creek at the Rt. 600 Bridge on the Radford South Quad (7.04 miles). This impairment also includes Poplar Branch and its tributaries form its mouth on Mill Creek to its headwaters as well as to unnamed tributaries to Mill Creek (XDE & XDF).

City / County: Montgomery Cc

Use(s): Recreation

Cause(s) /
VA Category: Fecal Coliform / 4A

The Mill Creek Bacteria Total Maximum Daily Load (TMDL) Study and allocations is complete with US Environmental Protection Agency (EPA) approval [Fed. ID 9453] on June 5, 2002 and SWCB approval on 6/17/2004 (formerly VAW-N21R-03). Additional bacteria sampling above and below the 1996 5.60 mile 303(d) impaired waters extend the original 1996 size by 9.67 miles in 2002. The 2002 / 2004 impaired waters now extend to the headwaters of Mill Creek (7.04 miles). 2002 tributary additions include Poplar Branch (4.58 miles) and two unnamed tributaries (XDE 1.73 miles and XDF 1.92 miles). The waters are impaired for a total of 15.27 miles.

The waters are originally 303(d) Listed based on the former fecal coliform WQS instantaneous criterion of 1000 cfu/100 ml and 200 geometric mean. The 2004 IR records exceedences of both the current FC 400 cfu/100 ml instantaneous criterion and geometric mean criterion of 200 cfu/100 ml. Listed below are the monitored sites showing fecal coliform instantaneous excursions / with total sample collections; (maximum) and geometric mean calculation exceedences / with total calculations where applicable. Instantaneous escherichia coli (E. coli) single observations are listed next (value). Each exceed the WQS instantaneous criterion of 235 cfu/100 ml.

Data below reflect the 2004 IR data window as there are no additional data with the exception of station 9-MLC001.53. Two ambient fixed sites 9-MLC005.44 and 9-MLC001.53 are included with the non-fixed sites below. Future assessment and 303(d) Listings will replace fecal coliform with escherichia coli (E.coli) bacteria as the indicator with sufficient E.coli data as per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters].

2004 IR results:
Mill Creek
9-MLC000.17 (Rt. 600 Bridge) - 3/5; (3900); 1/1 geomean; E. coli- 1/1 (800).
9-MLC001.31 (Rt. 693 Bridge) - 3/5; (2300); 1/1 geomean; E. coli- 1/1 (800) .
9-MLC001.53 (Rt. 693, Childress) - 3/6; (2300).
9-MLC002.74 (Rt. 669 Bridge) - 4/5; (>8000); 1/1 geomean; E. coli- 1/1 (800).
9-MLC005.44 (Rt. 8 Bridge-above Riner STP)- 18/25; (2500); E. coli- 1/1 (800).
9-MLC006.00 (Private road Rt. 616)- 2/5; (>8000); 0/1 geomean; E. coli- 1/1 (>800).

Poplar Branch
9-PPL000.01 (Private Road at mouth)- 1/1; (>8000).
9-PPL001.27 (Rt. 616 Bridge)- 2/2 (2800).

Mill Creek Unnamed Tributaries
9-XDE000.95 (Rt. 678 Bridge)- 4/5; (>8000); 1/1 geomean; E. coli- 1/1 (>800).
9-XDF000.11 (Private road Rt. 669)- 4/5;(2600); 1/1 geomean; E. coli- 1/1 (>800).

2006 IR results for 2006 stations within the data window:

New River Basin

Fact Sheet prepared for: Montgomery Co.*

Mill Creek
9-MLC005.44- FC exceeds the instantaneous criterion in 10 of 15 observations. Exceeding values range from 600 to 2000 cfu/100 ml.
9-MLC002.74- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in 10 of 12 observations. The maximum exceedence is greater than 8000 and the minimum is 500 cfu/100 ml.
9-MLC001.53- FC excursions are found in five of eight samples with a maximum of 2300 cfu/100 ml.

Assessment Unit / Water Name / Description	Cause Category / Name	Cycle First Listed	TMDL Schedule	Size
VAW-N21R_MLC01A00 / Mill Creek Lower / Mill Creek mainstem waters from its mouth on Meadow Creek upstream to the Montgomery County PSA Riner STP outfall.	4A Fecal Coliform	1996	2002	4.94
VAW-N21R_MLC02A00 / Mill Creek Upper / Mill Creek mainstem waters from the Montgomery County PSA Riner STP outfall upstream to its headwaters.	4A Fecal Coliform	1996	2002	2.10
VAW-N21R_PPL01A02 / Poplar Branch / Poplar Branch mainstem and tributaries from its confluence with Mill Creek upstream to its headwaters.	4A Fecal Coliform	2002	2002	4.58
VAW-N21R_XDE01A02 / Mill Creek UT (XDE) / An unnamed tributary (XDE) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC02A00.	4A Fecal Coliform	2002	2002	1.73
VAW-N21R_XDF01A02 / Mill Creek UT (XDF) / An unnamed tributary (XDF) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC01A00.	4A Fecal Coliform	2002	2002	1.92

Mill Creek, Poplar Branch, Mill Creek UTs (XDE & XDF)	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
Fecal Coliform - Total Impaired Size by Water Type:			15.27

Sources:

Livestock (Grazing or Feeding Operations)	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	Unspecified Domestic Waste	Wildlife Other than Waterfowl

*The narrative above describes the entire extent of the Impairment. Sizes presented may not represent the total overall size of the impairment. Impaired waters may cross or share jurisdictional boundaries and as a result are not strictly limited to a specific jurisdictional boundary.

2004 Use Attainment by Assessment Units (AU)

Watershed ID: VAW-N21R

Total Watershed Size: 258.21 M

AU ID: **VAW-N21R_ZZZ01A00** **134.11** M *AU Overall Category:* **3A**

LOCATION: Remaining Little River tributary waters in watershed N21R

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_XDF01A02** **1.92** M *AU Overall Category:* **4A**

LOCATION: An unnamed tributary (XDF) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC01A00.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-03	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
The bacteria TMDL Study is complete and US EPA approved on June 5, 2002 (Bacteria - Category 4A). An unnamed tributary (XDF) to Mill Creek is a 2002 addition to the 1998 Mill Creek bacteria impairment. The completed study can be accessed at http://www.deq.state.va.us. Assessment basis: DEQ station 9-XDF000.11 (SS). SS support for TMDL Study. 9-XDF000.11- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in four of five observations. The exceeding values range from 1000 to 2600 cfu/100 ml. The FC geometric mean exceeds the WQS criterion of 200 cfu/100 ml in one calculation. One E. coli collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at >800- not assessed. DO, Temp, pH, TP and NH3-N all Fully Support. No VDH fish consumption advisory.

AU ID: **VAW-N21R_XDE01A02** **1.73** M *AU Overall Category:* **4A**

LOCATION: An unnamed tributary (XDE) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC02A00.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-03	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
The bacteria TMDL Study is complete and US EPA approved on June 5, 2002 (Bacteria - Category 4A). An unnamed tributary (XDE) to Mill Creek is a 2002 addition to the 1998 Mill Creek bacteria impairment. The completed study can be accessed at http://www.deq.state.va.us. Assessment basis: DEQ station 9-XDE000.95 (SS). SS support for TMDL Study. 9-XDE000.95- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in four of five observations. Three of the exceeding values are >8000 cfu/100 ml. The FC geometric mean exceeds the WQS criterion of 200 cfu/100 ml in one calculation. One E. coli collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at >800- not assessed. One of two TP observations exceeds the 0.20 mg/l SV- insufficient to assess. The single TP excursion is 0.23 mg/l. DO, Temp, pH and NH3-N all Fully Support. No VDH fish consumption advisory.

2004 Use Attainment by Assessment Units (AU)

AU ID: **VAW-N21R_PPL01A02** **4.58** M *AU Overall Category:* **4A**

LOCATION: Poplar Branch mainstem and tributaries from its confluence with Mill Creek upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-03	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
The bacteria TMDL Study is complete and US EPA approved on June 5, 2002 (Bacteria - Category 4A). Poplar Creek is a 2002 addition to the 1998 Mill Creek bacteria impairment. The completed study can be accessed at http://www.deq.state.va.us. Assessment basis: DEQ stations 9-PPL000.01 (SS) and 9-PPL001.27 (SS). SS support for TMDL Study. 9-PPL001.27- Two exceedances from two FC samples exceed the 400 cfu/100 ml. One at 2100 and a second at 2800 cfu/100 ml. One TP observation exceeds the 0.20 mg/l SV- not assessed. The single TP excursion is 0.60 mg/l. DO, Temp, pH and NH3-N all Fully Support. 9-PPL000.01- Single observations of FC and TP finds FC exceeding at >8000 cfu/100 ml and TP exceeds the SV at 0.43 mg/l- not assessed. A single NH3-N observation Fully Supports. No VDH fish consumption advisory.

AU ID: **VAW-N21R_MLC02A00** **2.10** M *AU Overall Category:* **4A**

LOCATION: Mill Creek mainstem waters from the Montgomery County PSA Riner STP outfall upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Fully Supporting	
VAW-N21R-03	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	1996
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ stations 9-MLC006.00 (SS) and 9-MLC005.44 (AQ, '00 FT/Sed). SS support for TMDL Study. The bacteria TMDL Study is complete and US EPA approved on June 5, 2002 (Bacteria - Category 4A). The completed study can be accessed at http://www.deq.state.va.us. 9-MLC006.00- Two of five FC samples exceed the 400 cfu/100 ml WQS instantaneous criterion. The maximum occurrance is >8000. One Escherichia coli (E. coli) collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at 800- not assessed. One of two TP observations exceeds the 0.20 mg/l SV- insufficient to assess. The single TP excursion is 0.33 mg/l. DO, Temp, pH, TP, NH3-N/Full Support. 9-MLC005.44- WQS Fish tissue find no exceedances of TVs/TSVs/ nor any excusions of the PEC SVs for sediment. FC exceeds the instantaneous criterion in 18 of 25 observations. Exceeding values range from 500 to 2500 cfu/100 ml. One E. coli collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at 800- not assessed. DO, Temp, pH, TP, chlorophyll a, water column metals and organics (NH3-N) all Fully Support. No VDH fish consumption advisory.

AU ID: **VAW-N21R_MLC01A00** **4.94** M *AU Overall Category:* **4A**

LOCATION: Mill Creek mainstem waters from its mouth on Meadow Creek upstream to the Montgomery County PSA Riner STP outfall.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Fully Supporting	
VAW-N21R-03	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	1996
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ stations 9-MLC005.44 (AQ, '00 FT/Sed), 9-MLC002.74 (SS), 9-MLC001.53 (AQ), 9-MLC001.31 (SS) and 9-MLC000.17 (SS). SS support for TMDL Study. The bacteria TMDL Study is complete and US EPA approved on June 5, 2002 (Bacteria - Category 4A). The completed study can be accessed at http://www.deq.state.va.us. 9-MLC005.44- WQS Fish tissue find no exceedances of TVs/TSVs/ nor any excusions of the PEC SVs for sediment. 9-MLC002.74- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in 11 of 13 observations with a maximum value of >8000. One Escherichia coli (E. coli) collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at 800- not assessed. Four of nine TP observations exceed the 0.20 mg/l SV- 'Observed Effect'. TP excursions range from 0.26 to 0.39 mg/l. There are no excursions of the WQS for DO, Temp, pH or NH3-N, all Fully Support. 9-MLC001.53- FC excursions are found in three of six samples with a maximum of 2300 cfu/100 ml. DO, pH,Temp, TP and NH3-N all Fully Support. 9-MLC001.31- FC exceeds in 3 of 5 samples with a maximum of 2300 cfu/100 ml. One E. coli collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at 800- not assessed. One excursion of the TP SV of 0.20 mg/l is found at 0.34 mg/l from two observations- insufficient to assess. DO, Temp, pH and NH3-N all Fully Support. 9-MLC000.17- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in three of five observations with a maximum value of 3900. One E. coli collection exceeds the WQS instantaneous criterion of 235 cfu/100 ml at 800- not assessed. One excursion of the TP SV of 0.20 mg/l is found at 0.27 mg/l from three observations- insufficient to assess. DO, Temp and NH3-N all Fully Support. No VDH fish consumption advisory.

AU ID: **VAW-N21R_MDW30A00** **18.03** M *AU Overall Category:* **3A**

LOCATION: Tributary waters to Meadow and Mill Creeks.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_MDW02A00** **5.00** M *AU Overall Category:* **3A**

LOCATION: The mainstem waters of Meadow Creek from the mouth of Mill Creek upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_MDW01A00** **4.48** M *AU Overall Category:* **5A**

LOCATION: The Meadow Creek mainstem from its confluence with Little River upstream to the mouth of Mill Creek on Meadow Creek.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-02	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-MDW004.62 (AQ,SS). SS support for TMDL Study. Meadow Creek not part of 1998 Mill Creek 303(d) FC impairment. 9-MDW004.62-FC exceedances of the WQS 400 cfu/100 ml are found in seven of 12 observations; the geometric mean exceeds the WQS 200 criterion in 1 calculation. One pH exceedance at 9.11 SU is found in 11 measurements but still Fully Supports. DO, Temp, TP, chlorophyll a and NH3-N all Fully Support. No VDH fish consumption advisory.

2004 Use Attainment by Assessment Units (AU)

AU ID: **VAW-N21R_LRV07A00** **3.68** M *AU Overall Category:* **3A**

LOCATION: Little River mainstem from the WQS designated natural trout waters upstream to the mouth of the West Fork of Little River.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class VI Sec. 2 v No current data. These waters are unassessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_LRV06A04** **13.35** M *AU Overall Category:* **5A**

LOCATION: Little River from the end of Rt. 706 downstream to the confluence of Sidney Creek.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-04	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2004
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-LRV032.72 (AQ). 9-LRV032.72- Three of eight FC observations exceed the WQS 400 cfu/100 ml instantaneous criterion. Exceedances range from 600 to 1100 cfu/100 ml. DO, Temp, pH, TP, chlorophyll a and NH3-N all Fully Support.

AU ID: **VAW-N21R_LRV06A00** **8.04** M *AU Overall Category:* **2A**

LOCATION: The Little River mainstem from the mouth of Big Indian Creek upstream to the WQS designated natural trout water section.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
	Recreation	Insufficient Information	
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-LRV016.68 (AQ) and Citizen station 9LRV-1-SOS 9-LRV016.68- One of eight FC samples exceed the 400 cfu/100 ml criterion- insufficient to assess. The one excursion is at 900 cfu/100 ml. DO, Temp, pH, TP, chlorophyll a and NH3-N all Fully Support. 9LRV-1-SOS- 'LP'; Low Probability of adverse conditions. 6 Tradition Methods surveys rated as Excellent. No VDH fish consumption advisory.

AU ID: **VAW-N21R_LRV05A00** **12.26** M *AU Overall Category:* **2A**

LOCATION: The Little River mainstem waters from the mouth of Meadow Creek upstream to the mouth of Big Indian Creek.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
	Recreation	Insufficient Information	
	Wildlife	Fully Supporting	

2004 Use Attainment by Assessment Units (AU)

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-LRV009.11 (AQ) 9-LRV009.11- FC exceeds the WQS instantaneous criterion of 400 cfu/100 ml in one of eight samples at 600 cfu/100 ml. These data are insufficient to assess. No exceedances of WQS or SVs for DO, Temp, pH, TP, chlorophyll a and NH3-N all Fully Support. No VDH fish consumption Adv/EVAL.

AU ID: VAW-N21R_LRV04A00 **0.67** M **AU Overall Category: 5A**

LOCATION: Mainstem Little River from the PWS designated end upstream to the mouth of Meadow Creek.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
VAW-N21R-01	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Not Assessed	

WQS Class IV Sec. 2 v
Assessment basis: USGS station 03170000- Data older than 5 years. Station is basis for 2002 303(d) Listing Impaired for Recreational Use. USGS 03170000- 2002 assessment- FC exceedances of the former WQS instantaneous criterion of 1000 n/100 ml; two of 14 observations; if 2004 assessed four of 14 samples would exceed the 400 cfu/100 ml instantaneous criterion- not assessed. No VDH fish consumption advisory.

AU ID: VAW-N21R_LRV03A00 **0.62** M **AU Overall Category: 5A**

LOCATION: Mainstem Little River from the backwaters of Little River Reservoir upstream to the end of the designated PWS section from the Radford City intake.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
VAW-N21R-01	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2002
	Wildlife	Not Assessed	

WQS Class IV Sec. 2 PWS v
Assessment basis: USGS station 03170000- Data older than 5 years. Station is basis for 2002 303(d) Listing Impaired for Recreational Use. USGS 03170000- 2002 assessment- FC exceedances of the former WQS instantaneous criterion of 1000 n/100 ml; two of 14 observations; if 2004 assessed four of 14 samples would exceed the 400 cfu/100 ml instantaneous criterion- not assessed. No VDH fish consumption or drinking water advisories.

AU ID: VAW-N21R_LRV01A00 **0.49** M **AU Overall Category: 5A**

LOCATION: The mainstem waters of Little River from its mouth on the New River upstream to the Little River Reservoir Dam.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
	Public Water Supply	Fully Supporting	
VAW-N21R-01	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2004
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2b PWS v
Assessment basis: DEQ station 9-LRV000.34 (AQ) 9-LRV000.34- Four of 26 FC samples exceed the WQS instantaneous criterion of 400 cfu/100 ml. The exceedances range from 500 cfu/100 ml to 7300. No exceedances of sediment PEC SVs or WQS are found from DO, Temp, pH, TP, chlorophyll a or NH3-N; all Fully Support. No VDH fish consumption or drinking water advisories.

2004 Use Attainment by Assessment Units (AU)

AU ID: **VAW-N21R_LLL01A04** **3.25** M *AU Overall Category:* **5A**

LOCATION: Laurel Creek from its headwaters NW of Rts. 608 and 673 intersection downstream to its confluence with Little River.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-06	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2004
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-LLL000.05 (AQ) 9-LLL000.05- FC exceeds the WQS 400 cfu/100 ml instantaneous criterion in four of eight samples. The exceedances range from 600 to 2800 cfu/100 ml. DO, Temp, pH, TP, chlorophyll a and NH3-N Fully Support.

AU ID: **VAW-N21R_LIC02A04** **4.43** M *AU Overall Category:* **2A**

LOCATION: Little Indian Creek mainstem from its headwaters downstream to just upstream of the Rt. 631 crossing.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-LIC004.73 (FPM- VAEQ99-042). 9-LIC004.73- Single observations of FC, TP and chlorophyll a- not assessed. DO, Temp, pH, sediment and NH3-N all Fully Support. No VDH fish consumption advisory.

AU ID: **VAW-N21R_LIC01A04** **3.84** M *AU Overall Category:* **3A**

LOCATION: Little Indian Creek mainstem from just upstream of the Rt. 631 crossing downstream to its mouth on Big Indian Creek.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_LBC01A02** **2.95** M *AU Overall Category:* **3A**

LOCATION: Lost Bent Creek mainstem from its confluence with Little River upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class V Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

2004 Use Attainment by Assessment Units (AU)

AU ID: **VAW-N21R_BSH02A04** **5.18** M *AU Overall Category:* **3A**

LOCATION: Brush Creek mainstem from Floyd County Line downstream to the first bridge on Route 617 south of the junction of Routes 617 and 601.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class V Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_BSH01A04** **5.76** M *AU Overall Category:* **5A**

LOCATION: Brush Creek from the first bridge on Route 617 south of the junction of Routes 617 and 601 downstream to the Brush Creek mouth on Little River.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Fully Supporting	
	Fish Consumption	Not Assessed	
VAW-N21R-05	Recreation	Not Supporting	
	303(d) Parameter:	Total Fecal Coliform	2004
	Wildlife	Fully Supporting	

WQS Class IV Sec. 2 v
Assessment basis: DEQ station 9-BSH000.05 (AQ) 9-BSH000.05- The WQS instantaneous criterion for FC (400 cfu/100 ml) exceeds in three of eight samples. The maximum exceedance found is 1300 cfu/100 ml. DO, Temp, pH, TP, chlorophyll a and NH3-N all Fully Support. No VDH fish consumption advisory.

AU ID: **VAW-N21R_BIF01A02** **3.81** M *AU Overall Category:* **3A**

LOCATION: West Fork Big Indian Creek from its confluence on Big Indian Creek upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class V Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-N21R_BIC02A02** **5.41** M *AU Overall Category:* **3A**

LOCATION: Big Indian Creek mainstem from ~0.5 miles upstream of the West Fork Big Indian Creek mouth on upstream to its headwaters.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class VI Sec. 2 v No current data. These waters are not assessed. No VDH fish consumption advisory.

2004 Use Attainment by Assessment Units (AU)

AU ID: **VAW-N21R_BIC01A02** **7.58** M *AU Overall Category:* **5C**

LOCATION: Big Indian Creek mainstem from approximately 0.5 miles upstream of the West Fork Big Indian Creek mouth downstream to the Big Indian Creek confluence with Little River.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
VAW-N21R-07	**Aquatic Life**	**Not Supporting**	
	303(d) Parameter:	**Temperature, water**	**2004**
	Fish Consumption	**Not Assessed**	
	Recreation	**Fully Supporting**	
	Wildlife	**Fully Supporting**	

WQS Class V Sec. 2 v
Assessment basis: DEQ station 9-BIC000.14 (AQ). 9-BIC000.14- Temp excursions of the WQS stockable trout water criterion 21°C occur in two of eight measurements. The excursions are 24°C on 7/11/01 and 23°C on 7/10/02. FC, DO, pH, TP, chlorophyll a and NH3-N all Fully Support. No VDH fish consumption advisory.

2004 Integrated Report Watershed Assessment Unit Summary

Watershed ID: **VAW-N21R** LITTLE RIVER/INDIAN CREEK/BRUSH CREEK

Assessment Unit (AU)	TMDL ID	Overall AU Category	Stream & AU Description	AU Size
VAW-N21R_BIC01A02	**VAW-N21R-07**	5C	Big Indian Creek mainstem from approximately 0.5 miles upstream of the West Fork Big Indian Creek mouth downstream to the Big Indian Creek confluence with Little River.	7.58 MILES
VAW-N21R_BIC02A02		3A	Big Indian Creek mainstem from ~0.5 miles upstream of the West Fork Big Indian Creek mouth on upstream to its headwaters.	5.41 MILES
VAW-N21R_BIF01A02		3A	West Fork Big Indian Creek from its confluence on Big Indian Creek upstream to its headwaters.	3.81 MILES
VAW-N21R_BSH01A04	**VAW-N21R-05**	5A	Brush Creek from the first bridge on Route 617 south of the junction of Routes 617 and 601 downstream to the Brush Creek mouth on Little River.	5.76 MILES
VAW-N21R_BSH02A04		3A	Brush Creek mainstem from Floyd County Line downstream to the first bridge on Route 617 south of the junction of Routes 617 and 601.	5.18 MILES
VAW-N21R_LBC01A02		3A	Lost Bent Creek mainstem from its confluence with Little River upstream to its headwaters.	2.95 MILES
VAW-N21R_LIC01A04		3A	Little Indian Creek mainstem from just upstream of the Rt. 631 crossing downstream to its mouth on Big Indian Creek.	3.84 MILES
VAW-N21R_LIC02A04		2A	Little Indian Creek mainstem from its headwaters downstream to just upstream of the Rt. 631 crossing.	4.43 MILES
VAW-N21R_LLL01A04	**VAW-N21R-06**	5A	Laurel Creek from its headwaters NW of Rts. 608 and 673 intersection downstream to its confluence with Little River.	3.25 MILES
VAW-N21R_LRV01A00	**VAW-N21R-01**	5A	The mainstem waters of Little River from its mouth on the New River upstream to the Little River Reservoir Dam.	0.49 MILES
VAW-N21R_LRV03A00	**VAW-N21R-01**	5A	Mainstem Little River from the backwaters of Little River Reservoir upstream to the end of the designated PWS section from the Radford City intake.	0.62 MILES
VAW-N21R_LRV04A00	**VAW-N21R-01**	5A	Mainstem Little River from the PWS designated end upstream to the mouth of Meadow Creek.	0.67 MILES
VAW-N21R_LRV05A00		2A	The Little River mainstem waters from the mouth of Meadow Creek upstream to the mouth of Big Indian Creek.	12.26 MILES
VAW-N21R_LRV06A00		2A	The Little River mainstem from the mouth of Big Indian Creek upstream to the WQS designated natural trout water section.	8.04 MILES
VAW-N21R_LRV06A04	**VAW-N21R-04**	5A	Little River from the end of Rt. 706 downstream to the confluence of Sidney Creek.	13.35 MILES
VAW-N21R_LRV07A00		3A	Little River mainstem from the WQS designated natural trout waters upstream to the mouth of the West Fork of Little River.	3.68 MILES
VAW-N21R_MDW01A00	**VAW-N21R-02**	5A	The Meadow Creek mainstem from its confluence with Little River upstream to the mouth of Mill Creek on Meadow Creek.	4.48 MILES
VAW-N21R_MDW02A00		3A	The mainstem waters of Meadow Creek from the mouth of Mill Creek upstream to its headwaters.	5.00 MILES
VAW-N21R_MDW30A00		3A	Tributary waters to Meadow and Mill Creeks.	18.03 MILES
VAW-N21R_MLC01A00	**VAW-N21R-03**	4A	Mill Creek mainstem waters from its mouth on Meadow Creek upstream to the Montgomery County PSA Riner STP outfall.	4.94 MILES
VAW-N21R_MLC02A00	**VAW-N21R-03**	4A	Mill Creek mainstem waters from the Montgomery County PSA Riner STP outfall upstream to its headwaters.	2.10 MILES

2004 Integrated Report Watershed Assessment Unit Summary

VAW-N21R_PPL01A02	**VAW-N21R-03**	4A	Poplar Branch mainstem and tributaries from its confluence with Mill Creek upstream to its headwaters.	4.58	MILES
VAW-N21R_XDE01A02	**VAW-N21R-03**	4A	An unnamed tributary (XDE) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC02A00.	1.73	MILES
VAW-N21R_XDF01A02	**VAW-N21R-03**	4A	An unnamed tributary (XDF) to Mill Creek from its mouth upstream. The stream is located in the headwaters of Mill Creek flowing to VAW-N21R_MLC01A00.	1.92	MILES
VAW-N21R_ZZZ01A00		3A	Remaining Little River tributary waters in watershed N21R	134.11	MILES

VAW-N21R

OVERALL 2004 WATERSHED SUMMARY *

Total Watershed Size:

LITTLE RIVER/INDIAN CREEK/BRUSH CREEK

258.21 MILES

Total Assessment Units:

25

Federal Category 5 Waters

Waters 'Impaired' requiring TMDL Studies

	'Impaired' for one or more parameters	Believed Natural	One TMDL complete one or more remains
(VA Subcategories)	**5A**	**5C**	**5D**
Impaired Waters:	28.62	7.58	

Federal Categories 4A & 4C Waters

No further TMDL Study required

	Waters 'Impaired' TMDL complete	Waters 'Impaired' Natural
(VA Subcategories)	**4A**	**4C**
	15.27	

Federal Category 3 Waters

	No Data	Existing Data Insufficient to Assess	non-DEQ Data Method Collection and/or Laboratory not QA/QC'd Use Not Attained 'Waters of Concern'	Use Attained
(VA Subcategories)	**3A**	**3B**	**3C**	**3D**
Insufficient Data:	182.01			

Federal Category 2 Waters

	Fully Supports Assessed Uses	Fully Supports but are 'Waters of Concern'
(VA Subcategories)	**2A**	**2B**
Support Some Uses:	24.73	

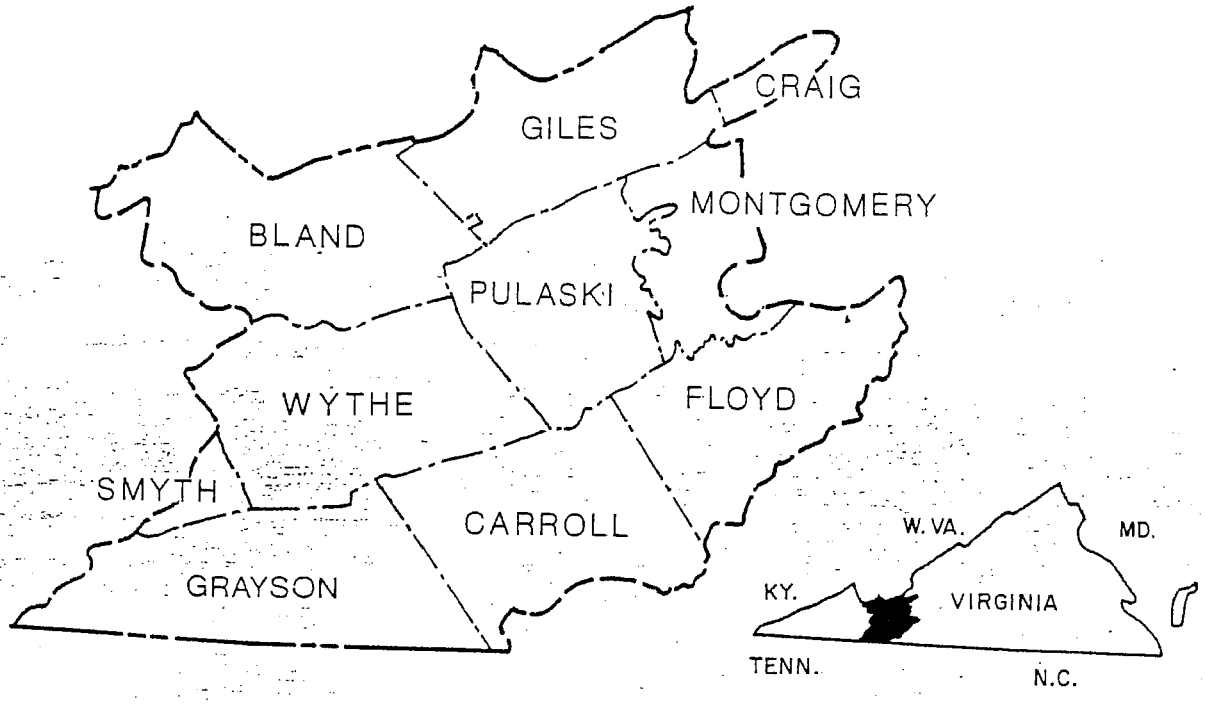
Federal Category 1 Waters

	'Fully Supports all Uses'
(VA Subcategories)	**1**
Supports All Uses:	

*** Note: Totals are based on Overall AU Category.**

STATE WATER CONTROL BOARD

NEW RIVER BASIN



COMPREHENSIVE WATER RESOURCES PLAN

VOLUME V-A

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RIVER BASIN WATER QUALITY MANAGEMENT PLAN

Planning Bulletin 205A

1976

VSWCB/PB/Q9/W-76/2

Riner Planning Area

Planning Area Description. (See Plate 12) The planning area consists of the community of Riner and the surrounding areas north and south along State Route 8 and east and west along State Route 669. The present population of 200 is projected to increase to 650 by 2020.

Existing System. The community of Riner is served by a 35,000 gallon per day secondary treatment plant (Plate 59) on Mill Creek west of State Route 8. This facility serves Auburn High School and the portion of Riner south of State Route 669. The collection system consists of an eight-inch interceptor along State Route 8, with an additional interceptor along State Route 671. The system is primarily supported by the school system rather than the community, and only a small number of residences are currently connected.

Water Quality Problems. There are no existing BOD related water quality problems in the Riner area (see Plate A-5, Appendix A). No other pollution problems are known to exist.

However, if residential users continue to depend upon individual septic systems rather than a central sewerage system, the projected population increase may result in soil saturation and unsatisfactory septic tank operation. Such a situation would result in a potential health hazard for the community.

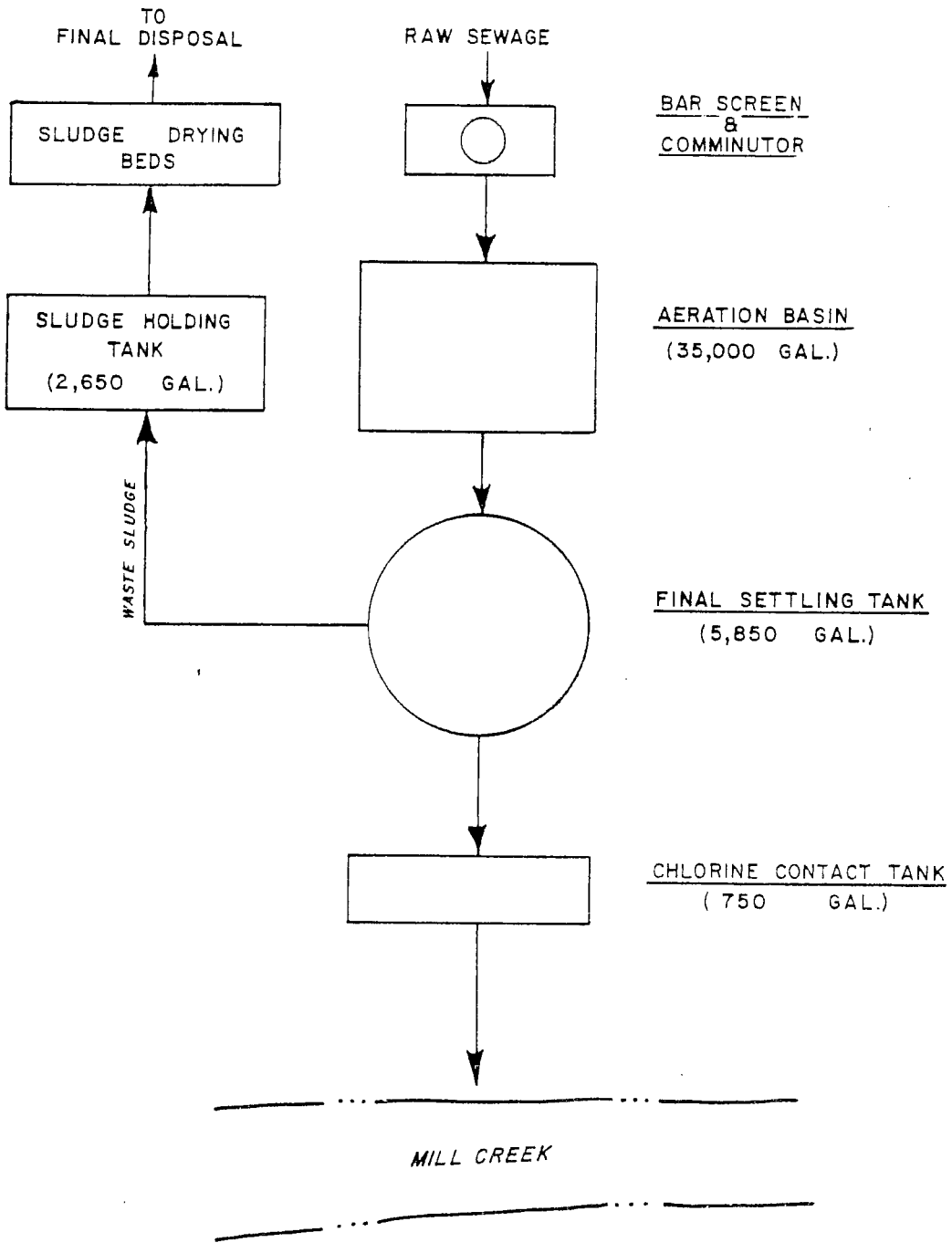
Degree of Treatment Required. Table 55 indicates that the maximum effluent BOD load for the Riner Planning Area is 20.4 pounds per

BLOCK DIAGRAM

RINER

EXISTING SEWAGE TREATMENT PLANT

DESIGN CAPACITY - 0.035 M.G.D.



SOURCE: THOMPSON & LITTON, INC.

PLATE No. 59

day. Based on this effluent limit and the sanitary raw wasteloads projected in Chapter III, a treatment level of 87.5 percent BOD removal will be required in 2020.

The minimum treatment level required by the Virginia State Water Control Board by 1977 is secondary treatment or 87.5 percent BOD removal. This level of treatment will be satisfactory through 2020.

Alternative Solutions. Based on per capita flows of 100 gallons per day in 1970, increasing to 175 gallons per day in 2020, the design flow for the Riner Planning Area is 0.021 million gallons per day for 1974 and 0.114 million gallons per day in 2020. The BOD loading ranges from 41 pounds per day in 1974 to 163 pounds per day in 2020 (Table 55).

There are two alternative solutions to the projected water quality problem in the planning area. One of these is concerned with the continued use and expansion of the existing Riner facility to 0.115 million gallons per day. The remaining alternative proposes the construction of a new 0.115 million gallons per day plant.

Alternative 1. A 0.08 million gallon per day expansion of the existing plant is proposed in this alternative. This system would include a lift station, approximately 4.0 miles of eight-inch sewer line, 1,500 feet of six-inch force main, and a 80,000 gallon per day package treatment plant to operate in parallel with the existing unit. The

expansion would be required by 1985. Collection lines would extend north along State Route 8, west along State Route 669, and additional branch lines from the existing interceptor along State Route 8.

Alternative 2 (M/R Plan Solution). Alternative 2 proposes a new 115,000 gallon per day treatment plant. This plant would be located further downstream on Mill Creek, allowing gravity flow from the northern portions of Riner. The system would include a 0.115 million gallon per day package treatment plant, approximately 2.1 miles of 10-inch sewer line, and 2.5 miles of eight-inch sewer line. The existing plant could be relocated elsewhere in the county to serve a small community. This improvement will be required by 1985.

Review and Testing of Alternatives. A cost estimate for Alternative 1 is presented in Table 207. Total project cost is around $711,288, while monthly user cost is $20.91 per connection. Total present worth is approximately $1,002,983.

A cost estimate for Alternative 2 is presented in Table 208. Total project cost is $819,444, while monthly user cost is $15.68 per connection. Total present worth is around $991,030.

An environmental comparison of the alternatives during both the construction and the operation phases is presented in Table 209. A detailed explanation of the environmental scoring system is presented in Appendix C. The environmental score for Alternative 1 is +1855, while the score for Alternative 2 is +1847.

TABLE 207

COST ESTIMATE
RINER PLANNING AREA
FUTURE ALTERNATIVE 1 - 1985
Extend Collection System & Expand Treatment Plant to 0.115 MGD

I.	CONSTRUCTION COST	$ 526,880
	1. Expand Existing Treatment Plant from 0.035 to 0.115 MGD	167,000
	2. 4.0 miles of 8-inch Sewer Line	295,680
	3. 1,500 L.F. of 6-inch Force Main	10,500
	4. Sewage Pumping Station	45,000
	5. 29 New Connections	8,700
II.	RELATED COSTS	184,408
III.	TOTAL PROJECT COST	711,288
IV.	GRANT FUNDS	604,594
V.	AMOUNT FINANCED	106,693
VI.	ANNUAL BUDGET	23,839
	1. Debt Retirement	6,218
	2. Debt Reserve	621
	3. Maintenance, Pump Station and Pipe	7,500
	4. Treatment Cost Increase Over Existing	9,500
VII.	PRESENT WORTH	1,002,983
	1. Initial Cost	711,288
	2. Present Worth of Operation & Maintenance	291,695
VIII.	AVERAGE USER COST* (75 Services)	
	1. Annual Cost	250.94
	2. Monthly Cost	20.91

*Includes 66 Equivalent Existing Connections

TABLE 208

COST ESTIMATE
RINER PLANNING AREA
FUTURE ALTERNATIVE 2 - 1985
Extend Collection System, Abandon Existing Plant, and Provide New 0.115 MGD Plant

I.	CONSTRUCTION COST	$606,996
	1. 2.5 miles of 8-inch sewer pipe	184,800
	2. 2.1 miles of 10-inch sewer pipe	188,496
	3. 0.115 MGD Treatment Plant	225,000
	4. 29 New Connections -	8,700
II.	RELATED COSTS	212,448
III.	TOTAL PROJECT COST	819,444
IV.	GRANT FUNDS	696,527
V.	AMOUNT FINANCED	122,917
VI.	ANNUAL BUDGET	17,879
	1. Debt Retirement	7,163
	2. Debt Reserve	716
	3. Maintenance, Pipelines	500
	4. Treatment Cost Increase over Existing	9,500
VII.	PRESENT WORTH	991,030
	1. Initial Cost	819,444
	2. Present Worth of Operation & Maintenance	171,585
VIII.	USER COST* (95 Services)	
	1. Annual Cost	188.20
	2. Monthly Cost	15.68

*Includes 66 Equivalent Existing Customers

TABLE 209

ENVIRONMENTAL IMPACT
RINER PLANNING AREA
NEW RIVER BASIN

IMPORTANCE	10 Surface Water	7 Ground Water	6 Fauna	5 Flora	5 Population	4 Land Use	4 Aesthetic	3 Odor	2 Noise	SUBTOTAL	TOTAL
ALTERNATIVE – CONSTRUCTION PHASE											
1	-2	0	-1	-1	0	0	0	0	-2	-35	-35
2*	-2	0	-1	-1	0	0	-2	0	-2	-43	-43
ALTERNATIVE – OPERATION PHASE											
1	+6	+1	+2	0	-1	-1	-2	+1	-1	+63	+1890
2*	+6	+1	+2	0	-1	-1	-2	+1	-1	+63	+1890
ALTERNATIVE – NET TOTAL											
1											+1855
2*											+1847

*Selected Alternative

Source: Thompson & Litton, Inc.

A summary of costs and environmental scores is presented in Table 210. The cost for each alternative presented is relatively high. It is recommended that a thorough re-evaluation of stream criteria be conducted to varify the limit of effluent limitations listed.

Selected Plan. The selected plan is Alternative 2, construction of a new 115,000 gallon per day treatment plant. This would be a package secondary treatment plant and would serve a total of 85 connections. Total project cost is $819,444, and monthly user cost is $15.68. Total present worth is $991,030. The net environmental score for this alternative is +1847. It is recommended that the plan be implemented by the Montgomery County Public Service Authority.

If the plan were adopted in 1985, the Montgomery County Public Service Authority would also have the option of moving the existing plant to the new site or utilizing the plant elsewhere in the county.

A map illustrating the area to be served is given as Plate 60, and a block diagram of the sewage treatment plant is on Plate 61.

Receiving Stream Segment Classification. Mill Creek is classified as follows:

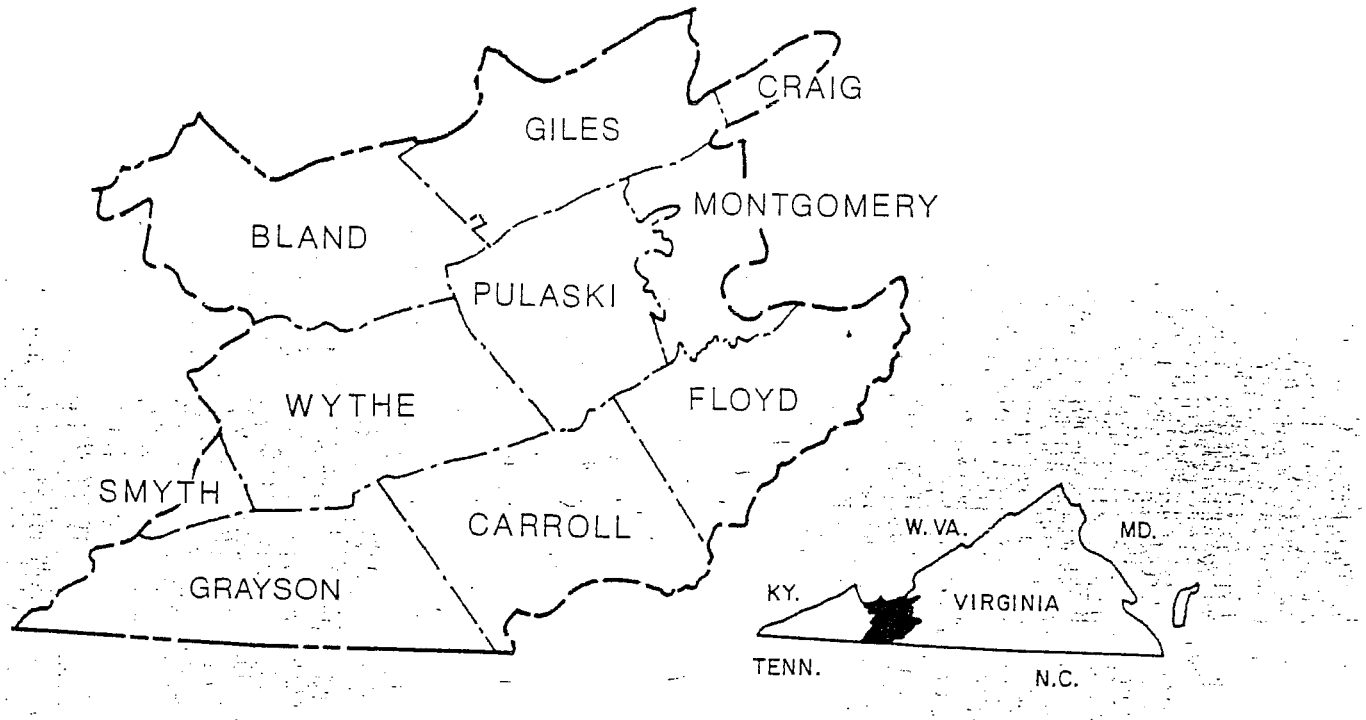
Past Classification	Effluent Limitation
New Classification (Tables 13 & 148)	Effluent Limitation (1974 through 2020)

Floyd Planning Area

Planning Area Description. (See Plate 12) The Floyd Planning Area includes the Town of Floyd and the immediate surrounding area.

STATE WATER CONTROL BOARD

NEW RIVER BASIN



COMPREHENSIVE WATER RESOURCES PLAN

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RIVER BASIN WATER QUALITY MANAGEMENT PLAN

Planning Bulletin 205A

1976

VSWCB/PB/Q9/W-76/3

APPENDIX A

Stream Profiles

Introduction

The graphs in Appendix A show five-day biochemical oxygen demand (BOD_5), stream assimilation capacities, background BOD_5 from non-point pollution sources, and total present and projected BOD_5 loadings for receiving streams in the Basin through the year 2020.

A receiving stream BOD_5 assimilation capacity is the maximum total loading the stream can receive and still maintain stream standards for dissolved oxygen during 7-day-10-year low flow conditions. Stream assimilation capacity is shown on the profiles as the yellow line. Background loadings are shown in green and present total BOD_5 loadings in blue. Projected future total BOD_5 loadings for 1980, 2000, and 2020 are also shown. Where a present or future total BOD_5 loading curve crosses above the stream assimilation capacity (yellow curve), violations of dissolved oxygen standards for that stream are expected to occur during low flow conditions.

On some stream segments in the Basin, removing 100 percent of the point source loadings will still not achieve stream standards. Diffuse, domestic, and direct discharges outside the planning areas are the source of this problem. In areas where this was encountered, it was assumed that implementation of the NPDES permit program along with strict enforcement of direct discharge regulations by local and state

authorities will result in a 90 percent removal of these wasteloads. With this accomplished, the relationship between total stream loading and assimilation capacity was reassessed and loading reductions required beyond secondary treatment and BPT allocated among significant discharges when needed.

The total loading curves on these streams, therefore, reflect 10 percent diffuse loadings, non-point source background loadings, and secondary effluent loadings from point sources in the planning area. If assimilation capacity is still exceeded, allocation of reductions beyond secondary and BPT required to meet stream standards are proposed as part of the Basin Plan but are not shown on the curves.

Implementation of secondary treatment for all significant municipal point discharges and the BPT equivalent for industries was assumed for point discharges on all streams by 1980. Therefore, advanced waste treatment, zero discharge, or growth control methodologies must be employed for point discharges situated on segments where violations are shown from 1980 through 2020. In effect, this would bring all future total BOD_5 curves to levels below stream assimilation capacity.

When non-degradation standards as authorized in Section 62.1-44.4(2) of the State Water Control Board Law are applied to surface streams, the 1980 total BOD_5 curve is assumed as the limit for

allowable in-stream BOD_5 on surface waters presently experiencing violations of standards. If a stream is currently not experiencing dissolved oxygen violations, the present total BOD_5 curve is the accepted non-degradation limit.

Stream assimilation capacities for the New River Basin were determined by using a regression equation derived by the Tennessee Valley Authority:[1]

$$Y = \frac{398{,}700\ (DO_{mix})^{0.951} Q^{1.026} S^{0.580}}{T^{1.474}\ (DO_{sag})^{1.434}}$$

Where:
- Y = BOD assimilation capacity (pounds/day)
- DO_{mix} = dissolved oxygen concentration of the mixed stream and effluent flow (ppm)
- Q = combined effluent and stream flow (cfs)
- S = channel slope (feet/foot)
- DO_{sag} = dissolved oxygen concentration allowable at the sag point (ppm)
- T = stream temperature (degrees Celsius)

Stream temperature at any reference point on a section was computed on the basis of 20° Celsius for drainage area runoff, 22° Celsius for wastewater, and 24° Celsius from impoundments.

Stream flows at the reference point were assumed to be at 7-day consecutive low flow with a 10-year recurrence interval. This flow was computed by determining the proportional drainage area located above the reference point and calculating flow based upon the applicable

[1] Tennessee and Big Sandy River Basins, Volume IV, p. TBS.

critical discharge value. Drainage areas were increased as tributaries entered the main stream at the appropriate rivermile location.

The initial dissolved oxygen concentration of receiving streams was assumed to be 7.2 mg/l. Channel slopes were calculated by locating differential elevations as close to the confluence of tributaries as possible.

Dissolved oxygen values at the sag point were assumed to be at the stream standard for minimum concentration as established by the Virginia State Water Control Board. Where exact figures were not available, the dissolved oxygen concentration of the mixed effluent and stream flow was obtained using the following formula:

$$DO_{mix} = \frac{(DO_S Q_S) + (DO_W Q_W)}{Q_S + Q_W}$$

Where:
DO_{mix} = dissolved oxygen concentration of the mixed stream and effluent flow (ppm)
DO_S = receiving stream dissolved oxygen (ppm)
DO_W = effluent dissolved oxygen (ppm)
Q_S = stream flow (cfs)
Q_W = effluent flow (cfs)

BOD_5 projections were based upon per capita loadings of from 0.20 pounds per day per capita in 1974 to 0.25 pounds per day per capita in 2020. Sewage flows from domestic sources were projected on the basis of 100 gallons per day per capita in 1974 and 175 gallons per day per capita in 2020.

The pollution parameter most frequently examined in this study is BOD. Other parameters were not modeled. However, data on iron and

manganese, acidity, nutrients, etc. were compiled from monitoring information and problem areas identified on this basis.

Receiving Stream Description

New River. The BOD profile, as shown on Plate A-1, indicates that the receiving stream meets water quality standards for present stream conditions and for those anticipated through the year 2020. The 7-day-10-year low flow of New River is quite large, resulting in a very high BOD assimilation capacity. The major sources of BOD loadings on the stream include the following: Independence, Fries, Galax, Austinville, Wytheville, Rural Retreat, Hillsville, Pulaski, Floyd, Fairlawn, Radford, Radford Arsenal, Blacksburg, Pearisburg, Narrows, Rich Creek and Bluefield. The Fries, Fairlawn, Radford, Radford Arsenal, Pearisburg, and Narrows discharges are directly to New River, while the remaining discharges are to tributaries of New River. The loadings do not result in violation of BOD assimilation capacity for the river.

Fox Creek. The BOD profile, as shown on Plate A-2, indicates that the receiving stream meets water quality standards for present stream conditions and for those anticipated through the year 2020. A proposed impoundment on the stream would reduce the BOD loading by sedimentation. The major source of pollution on the stream is the loading from its tributary, Middle Fox Creek, but this loading does not result in a violation of stream standards.

conditions. There are no major sources of water pollution. Population projections indicate insignificant growth through year 2020. Therefore, this stream conforms to the requirements of an effluent segment.

Elk Creek. The BOD profile, as shown on Plate A-4, indicates that the receiving stream meets water quality standards for present stream conditions and for those anticipated through the year 2020. The major source of pollution on the stream is the loading from its tributary, Knob Fork but this loading does not result in violation of the stream's BOD assimilation capacity. A proposed impoundment on the stream would reduce the BOD loading by sedimentation, but a net increase in loading occurs in a segment downstream. This can be attributed to the large background BOD loading from the drainage area. The stream conforms to the requirements of an effluent segment.

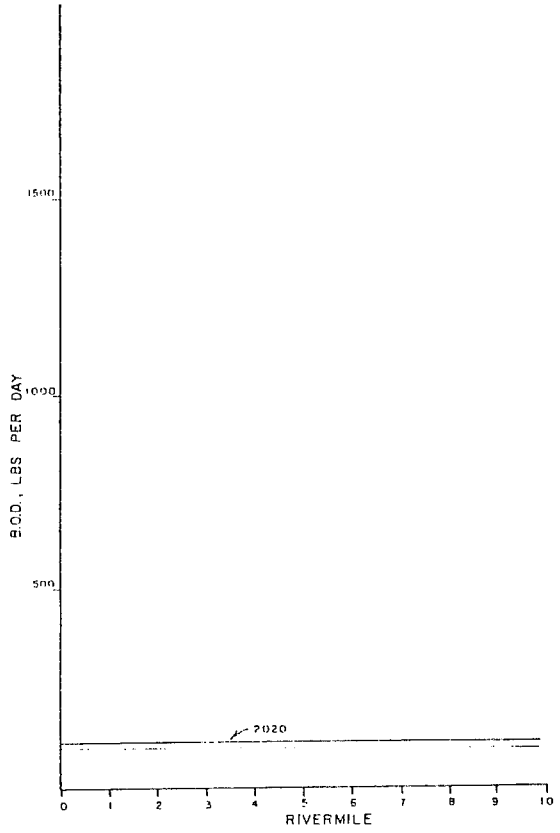
Mill Creek. From the BOD profile, as shown on Plate A-5, it is apparent that this stream meets water quality standards under existing conditions. There are no major sources of water pollution. Population projections indicate insignificant growth through year 2020. Therefore, this stream conforms to the requirements of an effluent segment.

Meadow Creek. From the BOD profile, as shown on Plate A-5, it is apparent that this stream meets water quality standards under existing conditions. There are no major sources of water pollution. Population

NEW RIVER BASIN

STREAM BOD_5 PROFILES FOR

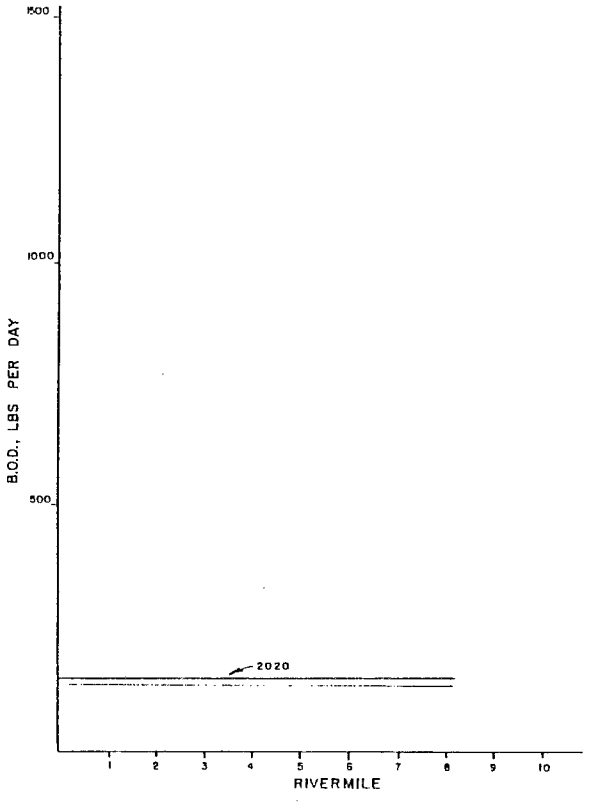
MILL CREEK



NEW RIVER BASIN

STREAM BOD_5 PROFILES FOR

MEADOW CREEK



SOURCE : THOMPSON & LITTON, INC.

PLATE No. A- 5

NOTE : FOR LEGEND SEE PAGE A-1

NEW RIVER BASIN

WATER QUALITY MANAGEMENT PLAN

Prepared in Accordance With
The Federal Water Pollution Control Act Amendments
of 1972, P.L. 92-500, Section 303(e) as Amended by
the Clean Water Act, P.L. 95-217

and

Section 62.1-44.15(3) and (13) of the Virginia
State Water Control Law

Adopted by the State Water Control Board
(Letter Ballot No. 4751) and September 6, 1980
Effective November 15, 1980

This Plan supersedes those portions of the Metropolitan Regional
Water Quality Management Plan that is the New River Basin

WATER QUALITY MANAGEMENT PLAN
FOR THE NEW RIVER BASIN

Preface

Scope of the Plan. The purpose of this management plan is to set forth those measures to be taken by the Virginia State Water Control Board (SWCB) for reaching and maintaining the applicable water quality goals for the Virginia portion of the New River Basin. This Plan also specifies actions by units of local government, industrial firms, agricultural interests and others necessary to reach and maintain these goals.

The Plan consists of the following four sections: State water quality goals, municipal and inudstrial wastes, nonpoint pollutant sources, and water quality monitoring. In each of these sections, the existing situation applicable to the given topic is discussed and the specific SWCB actions are presented.

It is the Board's intent that this Plan: (1) meet all applicable requirements of the Federal Regulations 40 CFR 130 and 131 for river basin water quality management plans; (2) be updated as necessary to reflect new or revised legislation, community development, or basin hydrologic conditions; and (3) provide input data and information for the Water Quality Inventory Report submitted annually to the U. S. Environmental Protection Agency.[1,2] Section 505 of the Federal Regulation 40 CFR 131 specifies that

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1. Federal Register, Volume 40, No. 230, pp. 55335-55349.
2. Section 305(b), P.L. 92-500, as Amended.

basin water quality management plans are to be reviewed every five years. It is the Board's intent to review the basin plans at least biennially.

Development and Adoption of the Plan. The Plan was prepared by the staff of the SWCB, based on existing water quality data and on a report by the engineering consulting firm of Thompson & Litton, Incorporated.[3] This planning project was funded jointly by appropriations from the Virginia General Assembly and by grants from the U. S. Environmental Protection Agency.

The New River Basin Advisory Committee was organized in the initial stages of the study development. Meetings were conducted during the study development phase and local inputs were obtained. The final Draft Plan[3] was reviewed and comments were addressed by the engineering consultants. Copies of the final Plan were then submitted to all committee members, including local officials of the New River Basin area. In addition, copies of the Plan were submitted to North Carolina and West Virginia officials since portions of the Interstate Basin are in these states.

This Plan is to be adopted by the SWCB as the primary guide for ensuring that water quality is adequately considered in any basin development programs. The adoption process consists of public participation, adoption by the Board, and filing with the Secretary of the Commonwealth. Future significant revisions to this Plan require a similar process.

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3. Thompson & Litton, Incorporated, New River Basin Comprehensive Water Resources Plan, Volume V-A.

State Water Quality Goals

Present Policy and Existing Situation. The overall water quality goal of the State is to ensure that surface and ground waters are maintained at the highest levels that are economically feasible. The SWCB carries out this policy by instituting programs that upgrade the quality levels of water in which the water quality standards are violated, and that maintain existing levels where the quality is higher than the minimum standards.[4] At least once each 3-year period, the SWCB conducts public hearings for the purpose of receiving comments on applicable water quality standards and, as appropriate, modifying and adopting revised standards.[5] When applied to the New River Basin, these goals call for water quality in the streams and reservoirs which is adequate for public water supplies, for recreational activities, and for the protection and propagation of fish and aquatic life.[6]

State-adopted water quality goals can be met by regulating and controlling the pollutants (point and nonpoint) discharged into surface and ground waters. The National Pollutant Discharge Elimination System (NPDES) Permit Program provides a procedure which regulates pollutants, including materials toxic to fish and aquatic life, being discharged from municipal sewerage and industrial wastewater outfalls, i.e., quantities of point source pollutants. These

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4. Commonwealth of Virginia, State Water Control Law, § 62.1-44.2; 62.1-44.36.

5. P.L. 92-500, Section 303(c).

6. SWCB, Water Quality Standards, § 1.01, 1.03 through 1.06, 2.01, 2.02, 4.02, 4.03.

limits of pollutant levels and resulting wastewater treatment requirements may be modified periodically as required by Federal or State statute.[7]

Mathematical Analysis of the Basin. Analysis of a basin such as the New for required waste treatment levels is best accomplished by subdividing it into a series of segments, determined on the basis of water quality and hydrologic characteristics. These segments are classified as either Effluent Limitation* or Water Quality Limitation, according to the degree of treatment necessary for attainment of established water quality goals.[8] Effluent limitation segments are those in which the water quality goals will be met after municipal facilities have "Secondary Treatment" level capabilities, and industrial facilities have "Best Practicable Technology" in their treatment plants.** Water Quality Limitation segments are those requiring treatment levels higher than the foregoing levels in order to meet the standards.[9]

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7. Section 402, P.L. 92-500, as Amended.

8. Thompson & Litton, Incorporated, New River Basin Comprehensive Water Resources Plan, Volume V-A, pp. 177-190, Appendix A-1 through A-69.

9. Sections 201 and 302, P.L. 92-500, as Amended.

*In the Consultant's report, segments were classified "Effluent" if streams receive only minor discharges, have no known water quality problems, and are along areas where no population or industrial growth is anticipated. Best Practicable Technology (BPT) will be sufficient to comply with State and EPA regulations.

**Best Practicable Technology (BPT) is a technical term defined in P.L. 92-500 and generally defines national minimum level of treatment for various industries.

The exact treatment levels required of each discharger in a Water Quality segment are determined using mathematical modeling and a waste load allocation system. Stream segment classifications are shown on Plate 1.

The TVA Flat Water Equation was utilized for stream water quality analysis and for allowable amounts of wastewater discharges in the Basin.[10] This formula was selected because its parameters require less extensive field data than do other equations, such as Streeter-Phelps. Given the comparatively limited amounts of data for much of the New Basin area, the use of the TVA Flat Water Equation presently appears to be the most expeditious approach for stream water quality analysis. As more data become available, alternative methods of analysis as defined in the SWCB Modeling Manual can be considered, and in future updates of this Plan, the appropriate action item(s) can be amended to reflect use of these other equations, and methods of analysis defined in the SWCB Modeling Manual. Depending on the scope of either the data collection efforts or the analysis, such alternative analyses can be applied either to the entire basin or to specific portions of it.

The mathematical equations yield the number of pounds per day or kg/day of 5-day biochemical oxygen demand (BOD_5) which can be assimilated. The effluent limits for each of the planning areas in the New River Basin are shown on Table 1.

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10. Thompson & Litton, Incorporated, New River Basin Comprehensive Water Resources Plan, Volume V-A, pp 177-190, Appendix A-1 through A-69.

TABLE 1

(1) (4)

EFFLUENT LIMITS
NEW RIVER BASIN

Discharge	Receiving Stream	Maximum BOD_5 Loading Limits (kg/day)
Troutdale	Fox Creek	6.1
Independence	Peachbottom Creek	13.5
Fries	New River	50.5
Galax	Chestnut Creek	240.3
Hillsville	Little Reed Island Creek	99.6
Woodlawn	Crooked Creek	69.5
Speedwell	Cripple Creek	17.4
Austinville	New River	19.5
Rural Retreat	South Fork	50.5
Wytheville	Reed Creek	298.3
Max Meadows	Reed Creek	82.4
(3) Pulaski	Peak Creek	316.8
Floyd	Dodd Creek	24.1
Riner	Mill Creek	9.8
Blacksburg	New River	583.4
Christiansburg	Crab Creek	359.4
(3) Dublin-New River-Fairlawn-Radford-Plum Creek	New River	772.7
Newport	Sinking Creek	2.9
Pembroke	New River	28.4
Bland	Walker Creek	10.3
Mechanicsburg	Walker Creek	3.1
Narrows-Pearisburg	New River	110.8
Bastian	Wolf Creek	10.4
Rocky Gap	Wolf Creek	9.0
Rich Creek	Rich Creek	19.9
Glen Lyn	New River	5.7
Bluefield	Bluestone River	136.4
(2) Abbs Valley	Laurel Fork	11.4
(2) Pocahontas	Laurel Fork	5.5
(2) Boissevain	Laurel Fork	5.9

(1) Other effluent limitations will be determined by Water Quality Standards and/or Best Available Technology requirements.

(2) Secondary treatment will be required until a further verification of the model is made to document the need for treatment beyond secondary.

(3) To join Radford Cluster.

(4) This Table supersedes Table 152, page 199, Thompson & Litton, Inc., New River Basin Comprehensive Water Resources Plan, Volume V-A.

Board Actions to Meet Water Quality Goals. The following Board actions will be taken:

1) *Adopt the segment classifications as presented in the Basin Planning Report to amend those given in the State Continuing Planning Process 1973-74,*[11,12] *and*

2) *Use either the TVA Flat Water Equation, the Streeter-Phelps Equation or some other mathematical model defined in the SWCB Modeling Manual in the calculations of future waste load allocations.*

Municipal and Industrial Wastes

Regional Planning Areas. Regional sewerage planning areas identified in this Basin are shown on Plate 2.

Wastewater Treatment Plants. Sewage system and treatment works data are presented in Table 2, and significant point source dischargers are shown in Plate 3.[13] Significant industrial wastewater discharge locations in the Basin watershed area are given in Table 3. The waste load allocation process described in the preceding section takes into account all of these dischargers.

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11. Thompson & Litton, Incorporated, New River Basin Comprehensive Water Resources Plan, Volume V-A, pp. 187-190.

12. SWCB, 1973-74 Continuing Water Quality Planning Process, pp. 1-8.

13. Ibid, pp. 57, 60.

Fecal Coliform TMDL for Mill Creek Watershed, Virginia

Submitted by

Virginia Department of Environmental Quality

Virginia Department of Conservation and Recreation

Prepared by

THE Louis Berger Group, INC.
1819 H Street, NW, Suite 900
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June 2002

3.5 Fecal Coliform Sources Assessment

This section will focus on characterizing the fecal coliform sources in the watershed that potentially contribute to the fecal coliform loading to Mill Creek. These sources include permitted facilities, sanitary sewer systems and septic systems, livestock, land application of manure and biosolids wildlife, and pets. Section 4 will include a detailed presentation of how these sources are incorporated and represented in the model.

3.5.1 Permitted Facilities

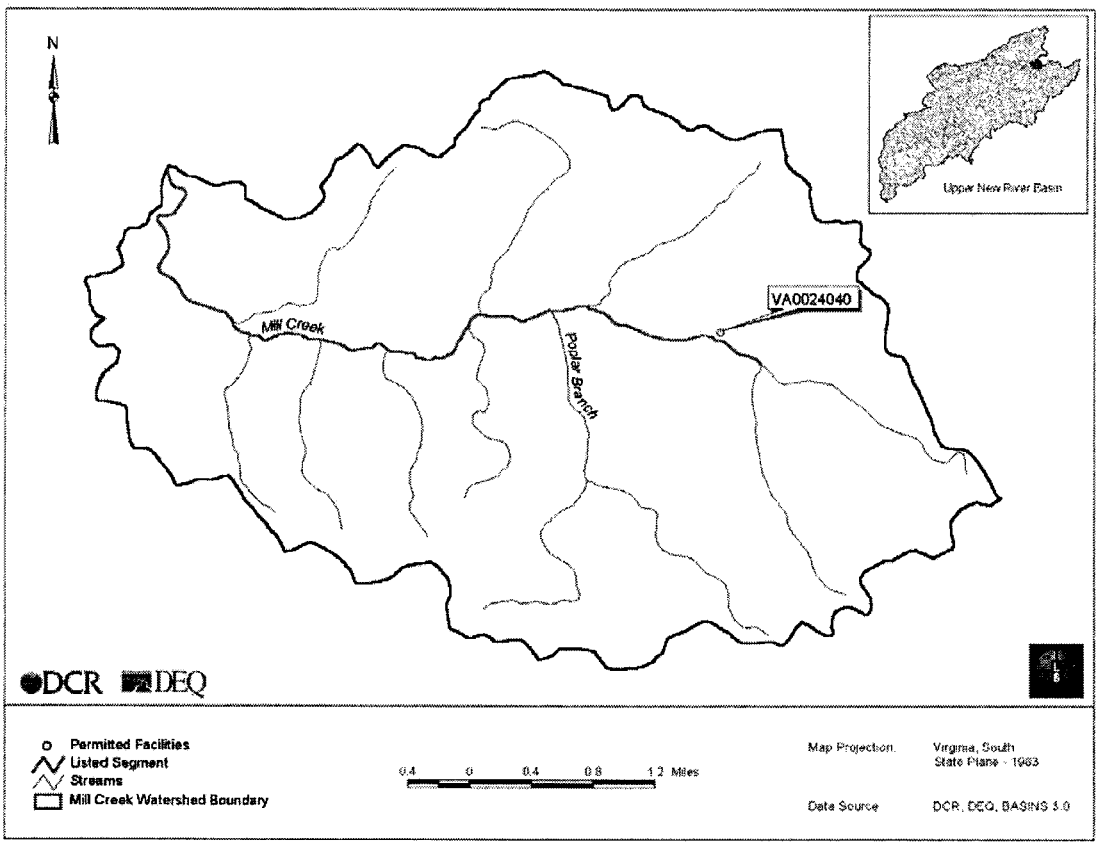
There is only one permitted facility located in the Mill Creek watershed based on data and information obtained from DEQ's West Central Regional Office. The Riner Sewage Treatment Plant (STP) permit number, design flow, and status are presented in Table 3-9. The location of the plant is presented in Figure 3-4.

Table 3-9: Permitted Discharge in the Mill Creek Watershed

Permit Number	Facility Name	Design Flow (gpd)[1]	Status
VA0024040	Riner STP	100,000	Active

1. gpd: gallons per day

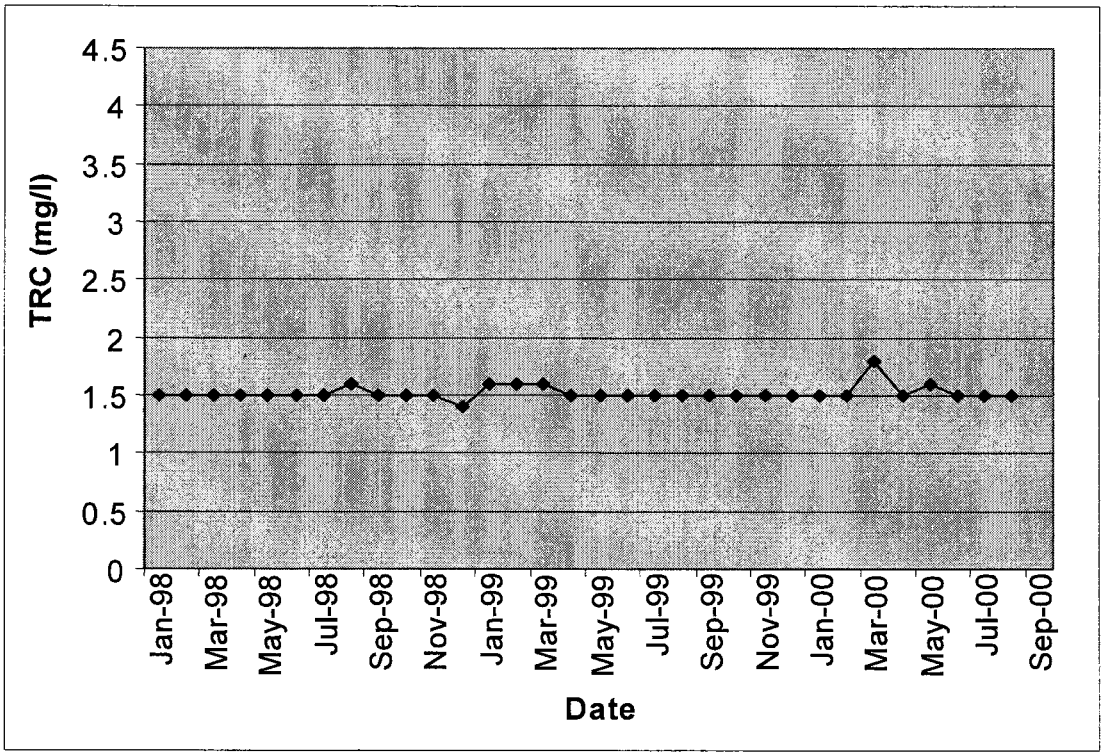
Figure 3-4: Location of Permitted Facility



The available flow and fecal coliform data for the Riner STP were retrieved and analyzed. Instantaneous flow data were available for September 2000 to October 2001, and the average daily flow data were available for January 1998 to July 2001. The maximum daily flow ranged from 14,000 to 51,000 gallons per day (gpd) (0.014 to 0.051 million gallons per day (MGD) and the average monthly flow ranged from 4,300 to 37,000 gpd (0.0043 to 0.037 MGD). Figures 3-5 and 3-6 show the variation of the Riner STP flow for the two periods. For the TMDL development, a flow of 10,000 gpd was considered representative of the Riner STP flow conditions. This flow was used in the HSPF model set-up and calibration.

The Riner STP switched from using chlorine to ultraviolet for disinfection in September 2000. Prior to this switch, the Riner STP reported the residual chlorine concentration levels; these are presented in Figure 3-7. Chlorine concentration data for the period from January 1998 to August 2000 indicate that total residual chlorine (TRC) concentrations ranged from 1.4 to 1.8 mg/l. This indicates that adequate disinfection was achieved at the plant.

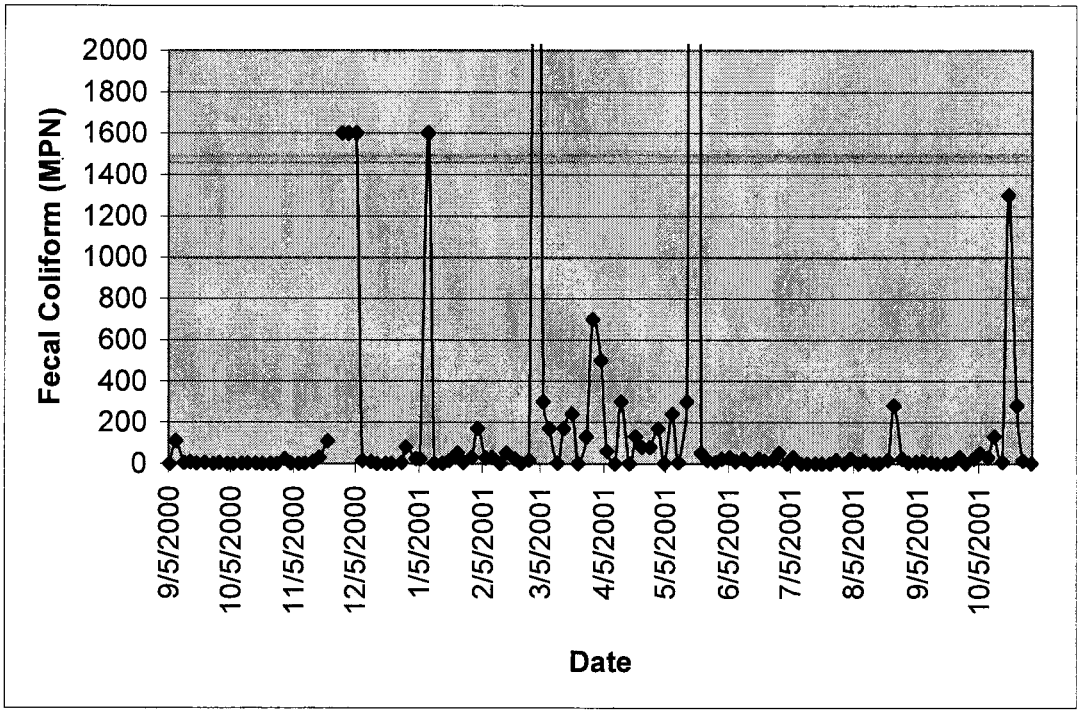
Figure 3-7: Riner STP TRC Concentration



Fecal coliform concentration data were available for the period from September 2000 to October 2001. Figure 3-8 shows the variation of the fecal coliform concentration in the plant effluent. The fecal coliform concentrations ranged from 0 to 16,000 most probable number (MPN). Although the daily values exceeded the 1,000 cfu/100 ml standard on seven occasions, no permit limit violation occurred during this reporting period based on the geometric mean standard of 200 cfu/100ml. For the Mill Creek TMDL development,

the 30-day geometric mean 200 cfu/100 ml concentration standard was used in the HSPF model, not the instantaneous 1,000 cfu/100 ml standard.

Figure 3-8: Riner STP Fecal Coliform Concentration



3.5.2 Extent of Sanitary Sewer Network

The extent of the sanitary sewer network was determined from maps provided by the Montgomery County Public Sewer Authority (Mabry, Per. Comm., October 29, 2001). The extent of the sewer system in the Mill Creek watershed is presented in Figure 3-9. The sewage collected in this network is conveyed to the sewer treatment plant located in the southern section of the Town of Riner. The housing units that are not served by a public sewer rely on septic systems for the treatment of household waste.

Estimates of the total number of households connected to the sewer system are presented in the next section.

4.7 Fecal Coliform Sources Representation

This section will show how the fecal coliform sources identified in Section 3.0 were included or represented in the model. These sources include permitted sources, human sources (failed septic systems and straight pipes), livestock, wildlife, pets, and land application of manure and biosolids.

4.7.1 Permitted Facilities

The only permitted discharger in Mill Creek watershed is the Riner Sewage Treatment Plant (STP). Table 4-4 shows the permitted facility identification number, the stream reach receiving the discharge, facility design discharge rate, and the permitted fecal coliform concentration.

The Montgomery County Public Sewer Authority provided maps that show the extent of the sewer system in the area (Mabry, 2001). The sewage collected from the 79 households connected to the network is conveyed to the STP located in the southern section of the Town of Riner. Based on data from DEQ's West Central Regional Office, a discharge rate of 10,000 gallons per day (gpd) is considered representative of the existing condition of the Riner STP. This discharge rate was used in the HSPF model calibration and validation.

For the TMDL allocation development the Riner STP was represented as a constant source discharging 100,000 gpd and a fecal coliform concentration of 200 cfu/100 ml.

Table 4-4: Permitted Dischargers in the Mill Creek Watershed

Permit Number	Receiving Stream Reach	Design Flow (gpd)[1]	Fecal Coliform Concentration (cfu/100ml)	Status
VA0024040	Mill Creek (5050001 96 3.77)	100,000	200	Active

1. gpd: gallons per day

The MOS will be explicitly incorporated into this TMDL. Incorporating a MOS of 5% will require that allocation scenarios be designed to meet the 30-day fecal coliform geometric mean standard of 190 cfu/100 ml with 0% exceedance.

5.2 Sensitivity Analysis

The sensitivity analysis of the fecal coliform loadings and the waterbody response provides a better understanding of the watershed conditions that lead to the water quality standard violation and provides insight and direction in developing the TMDL allocation and implementation. Based on the sensitivity analysis and consultation from DCR, several allocation scenarios were developed; these are presented in the next section. For each scenario developed the percent of days the water quality conditions violate both the 30-day geometric mean standard and the instantaneous fecal coliform standard is shown.

The results of the sensitivity analysis are presented in Appendix D.

5.3 Allocation Scenario Development

Allocation scenarios that would reduce the existing fecal coliform load to meet water quality standards were simulated using the HSPF model.

5.3.1 Wasteload Allocation

There is one permitted point source discharge in the Mill Creek watershed. The Riner Sewage Treatment Plant (STP) is permitted to discharge 100,000 gallons of treated water at a fecal coliform concentration of 200 cfu/100 ml. For this TMDL, the wasteload allocation for the Riner STP is to maintain the discharge and fecal coliform concentration at their permit levels (100,000 gallons per day and 200 cfu/100 ml) (Table 5-1).

Table 5-1: Mill Creek Wasteload Allocation

Permit Number	Existing Load (cfu/day)	Allocated Load (cfu/day)	Percent Reduction
VA 0024040	7.19E+8	7.19E+8	0%

5.3.2 Load Allocation

The reduction of loading from nonpoint sources, including livestock and wildlife direct deposition is incorporated into the load allocation. A number of load allocation scenarios were developed to determine the final TMDL load allocation scenario. The scenarios considered are presented in Table 5-2 and can be summarized as follows:

- Scenario 0 represents the existing loading, which is no reduction of any of the sources;
- Scenario 1 represents elimination of the human sources (septic systems and straight pipes),
- Scenario 2 represents elimination of the human sources (septic systems and straight pipes) and 50 percent reduction of the direct instream loading from livestock;
- Scenario 3 represents elimination of the human sources (septic systems and straight pipes) and a 75 percent reduction of the direct instream loading from livestock;
- Scenario 4 represents elimination of the human sources (septic systems and straight pipes) as well as the direct instream loading from livestock;
- Scenario 5 represents the direct instream loading from wildlife (all other sources are eliminated);
- Scenario 6 represents elimination of the human sources (septic systems and straight pipes) and the direct instream loading from livestock and a 50 percent reduction of the direct in-stream loading from wildlife;
- Scenario 7 represents elimination of the human sources (septic systems and straight pipes) and the direct instream loading from livestock and a 75 percent reduction of the direct in-stream loading from wildlife;

- Scenario 8 represents elimination of the human sources (septic systems and straight pipes) and the direct instream loading from livestock and an 80 percent reduction of the direct in-stream loading from wildlife; and
- Scenario 9 represents elimination of the human sources (septic systems and straight pipes) and the direct instream loading from livestock, an 80 percent reduction of the direct in-stream loading from wildlife, and a 20 percent reduction of the loading from nonpoint sources.

Table 5-2: Mill Creek Load Allocation Scenarios

Scenario	Reduction in Loadings from Existing Conditions (%)				
	Failing Septic Systems and Pipes	Direct Livestock	Nonpoint Sources	Pets	Direct Wildlife
0	-	-	-	-	-
1	100	-	-	-	-
2	100	50	-	-	-
3	100	75	-	-	-
4	100	100	-	-	-
5	100	100	100	100	-
6	100	100	-	-	50
7	100	100	-	-	75
8	100	100	-	-	80
9	100	100	20	-	80

For the hydrologic period from January 1995 to December 2000, the fecal coliform loading and the instream fecal coliform concentrations were estimated for each potential scenario using the developed HSPF model of the Mill Creek watershed. The estimated load reductions resulting from these allocation scenarios are presented in Table 5-3. Table 5-3 shows the estimated load reduction under each scenario and the percent of days the 190 cfu/100 ml water quality standard was violated. The following conclusions can be made:

1. Under existing conditions, the water quality standard was violated all the time (Scenario 0);

2. Elimination of the human sources (failed septic systems and straight pipes) and the livestock direct instream loading would result in a 99 percent violation of the water quality standard (Scenario 4);
3. Allocating only direct instream loading from wildlife results in a 90 percent violation of the water quality standard (Scenario 5); and
4. No violation of the water quality standard was achieved in Scenario 9, in which there is complete elimination of the human sources (failed septic systems and straight pipes) and livestock direct deposition, an 80 percent reduction of the wildlife direct loading, and 20 percent reduction of nonpoint sources of fecal coliform.

Table 5-3: Mill Creek Load Reduction under 30-Day Geometric Mean Standard

Scenario Number	Reduction in Loadings from Existing Conditions (%)					% Days Geometric Mean exceed 190 cfu/100ml
	Failed Septic Systems and Pipes	Direct Livestock	Nonpoint Sources	Pets	Direct Wildlife	
0	-	-	-	-	-	100
1	100	-	-	-	-	100
2	100	50	-	-	-	100
3	100	75	-	-	-	100
4	100	100	-	-	-	99
5	100	100	100	100	-	90
6	100	100	-	-	50	83.7
7	100	100	-	-	75	12.2
8	100	100	-	-	80	1.4
9	100	100	20	-	80	0

5.4 TMDL Summary

Based on load allocation scenario analysis, a TMDL allocation plan to meet the 30-day geometric mean water quality standard goal of 190 cfu/100 ml requires:

- 100 percent reduction of the human sources (failed septic systems and straight pipes);
- 100 percent reduction of the direct instream loading from livestock;
- 80 percent reduction of the fecal coliform loading from wildlife; and

- 20 percent reduction of the fecal coliform loading from nonpoint sources.

Table 5-5 shows the distribution of the annual average fecal coliform load under existing conditions and under the TMDL allocation by land use and source. The monthly distribution of these loads is presented in Appendix C.

Table 5-4: Distribution of Annual Average Fecal Coliform Load under Existing Conditions

Land Use/Source	Annual Average Fecal Coliform Loads		Percent Reduction
	Existing	Allocation	
Forest	4.89E+11	4.89E+11	0%
Low Density Residential	1.35E+12	1.35E+12	0%
Med Intensity Residential	7.47E+11	7.47E+11	0%
Pasture/Hay	5.03E+14	4.02E+14	20%
Unimproved Pasture/Hay	2.50E+09	2.00E+09	20%
Row Crops	6.58E+11	5.26E+11	20%
Commercial/Industrial/Transportation	5.19E+10	5.19E+10	0%
Farmstead	7.27E+11	7.27E+11	0%
Septic load	1.13E+11	0	100%
Direct deposition from cattle	4.25E+14	0	100%
Direct deposition from wildlife	6.66E+13	1.33E+13	80%
Point Source (1)	2.62E+11	2.62E+11	0

Figure 5-1 shows the existing fecal coliform loading and the fecal coliform loading after applying the allocation scenario 9. A summary of the fecal coliform TMDL allocation plan loads for Mill Creek is presented in Table 5-6.

Figure 5-1: Existing and Allocated Fecal Coliform Loadings

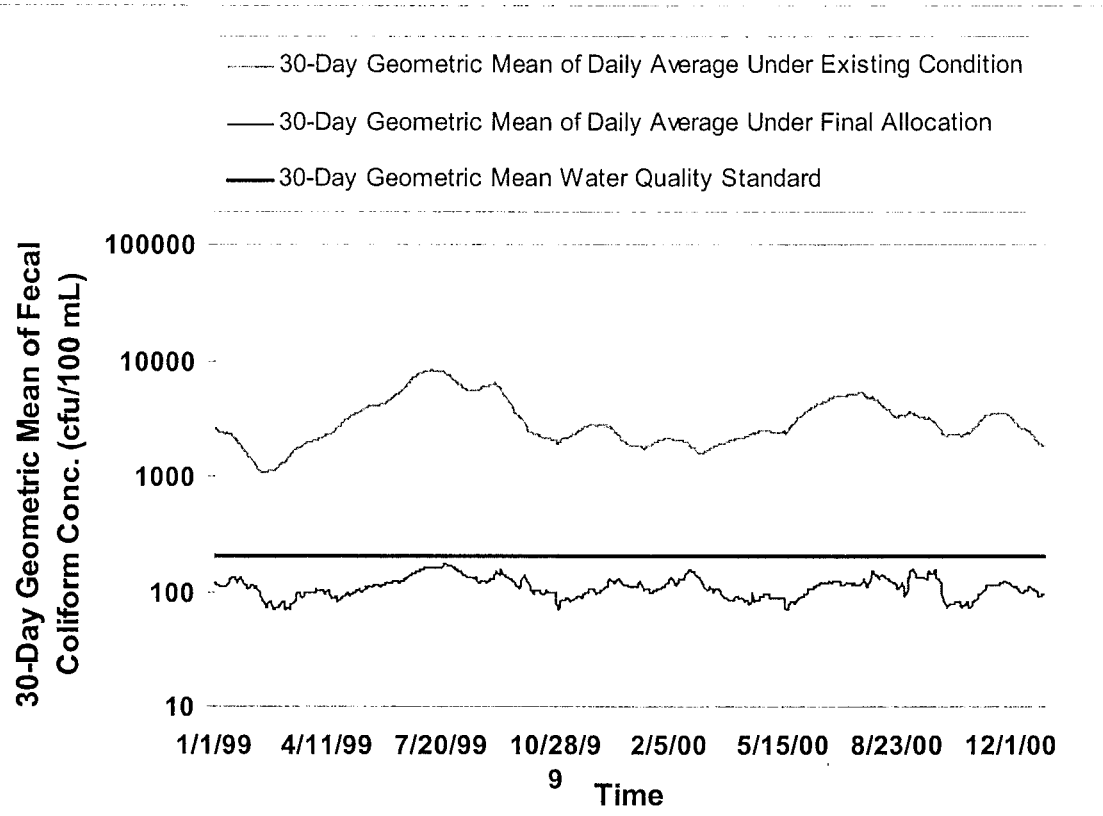


Table 5-5: Mill Creek TMDL Allocation Plan Loads (cfu/year)

Point Sources (WLA)	Nonpoint sources (LA)	Margin of safety (MOS)	TMDL
2.62E+11	4.18E+14	2.32E+12	4.22E+14

Decision Rationale

Total Maximum Daily Load for
Fecal Coliform for Mill Creek

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those water bodies identified as impaired by a state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water quality-limited water body.

This document will set forth the Environmental Protection Agency's (EPA) rationale for approving the TMDL for fecal coliform for Mill Creek. EPA's rationale is based on the determination that the TMDL meets the following eight regulatory conditions pursuant to 40 CFR §130.

1) The TMDL is designed to implement applicable water quality standards.
2) The TMDL includes a total allowable load as well as individual waste load allocations and load allocations.
3) The TMDL considers the impacts of background pollutant contributions.
4) The TMDL considers critical environmental conditions.
5) The TMDL considers seasonal environmental variations.
6) The TMDL includes a margin of safety.
7) There is reasonable assurance that the TMDL can be met.
8) The TMDL has been subject to public participation.

II. Background

The 14.54 square-mile Mill Creek watershed is located in Montgomery County. The TMDL addresses a 5.68 mile stream stretch, beginning 0.4 miles upstream of the Route 8 Bridge and terminating at Mill Creek's confluence with Meadow Creek. Agricultural (73%) and forested (22%) lands make up roughly 95% of the 14.5 square-mile watershed. Improved pasture makes up 61% of the watershed area.

In response to Section 303(d) of the CWA, the Virginia Department of Environmental Quality (VADEQ) listed 5.68 miles of Mill Creek as being impaired by elevated levels of fecal coliform on Virginia's 1998 Section 303(d) list. Mill Creek was listed for violations of Virginia's fecal coliform

bacteria water quality standard. During the 1998 assessment period 11 of the 18 samples recorded at the upstream sampling location failed to attain the instantaneous standard. Three of the six samples taken from the downstream monitoring station failed to attain the standard during the same assessment period. Fecal coliform is a bacterium which can be found within the intestinal tract of all warm blooded animals. Therefore, fecal coliform can be found in the fecal wastes of all warm blooded animals. Fecal coliform in itself is not a pathogenic organism. However, fecal coliform indicates the presence of fecal wastes and the potential for the existence of other pathogenic bacteria. The higher concentrations of fecal coliform indicate the elevated likelihood of increased pathogenic organisms.

EPA has been encouraging the states to use e-coli and enterococci as the indicator species instead of fecal coliform. A better correlation has been drawn between the concentrations of e-coli and enterococci, and the incidence of gastrointestinal illness. The Commonwealth plans on adopting the e-coli and enterococci standards in late 2002.

As Virginia designates all of its waters for primary contact, all waters must meet the current fecal coliform standard for primary contact. Virginia's standard applies to all streams designated as primary contact for all flows. Through the development of this and other similar TMDLs, it was discovered that natural conditions (wildlife contributions to the streams) could cause or contribute to violations of the fecal coliform standard. Bacterial source tracking (BST) sampling data collected on Mill Creek indicated that fecal coliform from wildlife alone can represent up to 67% of the instream fecal coliform concentration. Thus, many of Virginia's TMDLs have called for some reduction in the amount of wildlife contributions to the affected streams. EPA believes that a significant reduction in wildlife is not practical and will not be necessary due to the implementation plan discussed below.

A phased implementation plan will be developed for all streams in which the TMDL calls for reductions in wildlife. In the first phase of the implementation, the Commonwealth will begin implementing the reductions (other than wildlife) called for in the TMDL. In Phase 2, which can occur concurrently to Phase 1, the Commonwealth will consider addressing its standards to accommodate this natural loading condition. The Commonwealth has indicated that during Phase 2, it will evaluate the following items in relation to the standard. The Commonwealth may develop a Use Attainability Analysis (UAA) for streams with wildlife reductions which are not used for frequent bathing. Depending upon the result of the UAA, it is possible that these streams could be designated for secondary contact. The Commonwealth will also investigate incorporating a natural background condition for the bacteriological indicator.

After the completion of Phase 1 of the implementation plan, the Commonwealth will monitor the stream to determine if the wildlife reductions are actually necessary, as the violation level associated with the wildlife loading may be smaller than the percent error of the model or the MOS. In Phase 3, the Commonwealth will investigate the sampling data to determine if further load reductions are needed in order for these waters to attain standards. If the load reductions and/or the new application of standards allow the stream to attain standards, then no additional work is warranted. However, if

standards are still not being attained after the implementation of Phases 1 and 2, further work and reductions will be warranted.

Mill Creek identified as watershed VAW-N21R, was given a high priority for TMDL development. Section 303(d) of the CWA and its implementing regulations require a TMDL to be developed for those waterbodies identified as impaired by the state where technology-based and other controls do not provide for the attainment of water quality standards. The TMDL submitted by Virginia is designed to determine the acceptable load of fecal coliform which can be delivered to Mill Creek, as demonstrated by the Hydrologic Simulation Program Fortran (HSPF)[1], in order to ensure that the water quality standard is attained and maintained. HSPF is considered an appropriate model to analyze this watershed because of its dynamic ability to simulate both watershed loading and receiving water quality over a wide range of conditions.

The TMDL analysis allocates the application/deposition of fecal coliform to land based and instream sources. For land based sources, the HSPF model accounts for the buildup and washoff of pollutants from these areas. Buildup (accumulation) refers to all of the complex spectrum of dry-weather processes that deposit or remove (die-off) pollutants between storms.[2] Washoff is the removal of fecal coliform which occurs as a result of runoff associated with storm events. These two processes allow the HSPF model to determine the amount of fecal coliform from land based sources which is reaching the stream. Point sources and wastes deposited directly to the stream were treated as direct deposits. These wastes do not need a transport mechanism to allow them to reach the stream. The allocation plan calls for the reduction in fecal coliform wastes delivered by cattle in-stream, wildlife in-stream, straight pipes, failing septic systems, and specific land uses.

Table 1 - Summarizes the Specific Elements of the TMDL.

Segment	Parameter	TMDL	WLA (cfu/yr)	LA (cfu/yr)	MOS (cfu/yr)
Total	Fecal Coliform	4.00E+14	2.62E+11	3.98E+14	2.32E+12

1 Virginia includes an explicit MOS by identifying the TMDL target as achieving the total fecal coliform water quality concentration of 190 cfu/100ml as opposed to the WQS of 200 cfu/ml. This can be viewed explicitly as a 5% MOS.

EPA believes it is important to recognize the conceptual difference among the waste load allocation (WLA) values, load allocation (LA) values for sources modeled as direct deposition to stream segments, and LA values for flux sources of fecal coliform to land use categories. The WLA

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[1]Bicknell, B.R., J.C. Imhoff, J.L. Little, and R.C. Johanson. 1993. Hydrologic Simulation Program-FORTRAN (HSPF): User's Manual for release 10.0. EPA 600/3-84-066. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.

[2]CH2MHILL, 2000. Fecal Coliform TMDL Development for Cedar, Hall, Byers, and Hutton Creeks Virginia,

values and LA values for direct sources represent the amount of fecal coliform which is actually deposited into the stream segments. The HSPF model, which considers landscape processes which affect fecal coliform runoff from land uses, determines the amount of fecal coliform which reaches the stream segments. The LA in Table 1 is the amount of colony forming units (cfu) reaching the edge of stream from wet weather driven nonpoint sources annually.

The United States Fish and Wildlife Service has been provided with copy of this TMDL.

III. Discussion of Regulatory Conditions

EPA finds that Virginia has provided sufficient information to meet all of the eight basic requirements for establishing a fecal coliform TMDL for Mill Creek. EPA is therefore approving this TMDL. Our approval is outlined according to the regulatory requirements listed below.

1) The TMDL is designed to meet the applicable water quality standards.

Virginia has indicated that excessive levels of fecal coliform due to nonpoint sources (both wet weather and directly deposited nonpoint sources) have caused violations of the water quality standards and designated uses on Mill Creek. The water quality criterion for fecal coliform is a geometric mean 200 cfu/100mL or an instantaneous standard of no more than 1,000 cfu/100ml. Two or more samples over a 30 day period are required for the geometric mean standard. Since the state rarely collects more than one sample over a thirty-day period, most of the samples are measured against the instantaneous standard. There have been eight monitoring stations in the Mill Creek watershed that have been sampled intermittently since 1988. These stations have experienced violation rates from 47% to 100%. The two most frequently monitored stations have been samples 58 and 22 times since 1988 and have violated the instantaneous standard 47% to 55% of the time.

The HSPF model is being used to determine the fecal coliform deposition rates to the land as well as loadings to the stream from point and other direct deposit sources necessary to support the fecal coliform water quality criterion and primary contact use. The following discussion is intended to describe how controls on the loading of fecal coliform to Mill Creek will ensure that the criterion is attained.

The TMDL modelers determined the fecal coliform production rates within the watershed. Data used in the model was obtained on a wide array of items, including farm practices in the area, the amount and concentration of farm animals, point sources in the watershed, animal access to the stream, wildlife in the watershed, wildlife fecal production rates, land uses, weather, stream geometry, etc.. The model combined all the data to determine the hydrology and water quality of the stream.

Calibration is the process of comparing modeled data to observed data and making appropriate

adjustments to model parameters to minimize the error between observed and simulated events.[3] A "paired watershed" approach was used for the hydrology calibration for Mill Creek. A "paired watershed" or "equivalent watershed" approach was used because there was insufficient hydrology data on Mill Creek. In a "paired watershed" approach, the modelers model the hydrology of a stream with a long term hydrologic record (Tinker Creek) that would have a response similar to the watershed being studied (Mill Creek).

The Tinker Creek watershed had very similar land uses to Mill Creek with agriculture and forests making up 98% of the watershed. United States Geological Survey (USGS) had a continuous gage monitoring flow on Tinker Creek from 1956 through 2000. The calibration was run from September 1993 through August 1998. Weather data for the model was obtained from Covington Filter Plant and Roanoke Regional Airport. Several parameters including the evapotranspiration rate, recession rates to groundwater and interflow, storage capacity within the subsurface and surface zones, slope, and forest cover were evaluated and or adjusted to insure that the calibration closely represented the observed data. The statistical flow checks indicated that the simulation matched the observed flow data on Tinker Creek within the accepted bounds.

A validation run was conducted to see how well the model simulated observed data from Tinker Creek over a different time period. This was conducted to insure that the model could simulate different conditions on Tinker Creek. The validation used data from October1999 through September 2000. The simulated data from the validation compared favorably to the observed conditions as well.

The model was then transferred to Mill Creek for water quality calibration. The water quality calibration was from January 1994 to December 1995. The model was then validated against observed data form January 1996 through December 1998. These periods were chosen because they were more extensively sampled then other time periods. During the water quality calibration and validation hourly simulated data was evaluated against the sporadic grab samples.

EPA believes that using HSPF to model and allocate fecal coliform will ensure that the designated uses and water quality standards will be attained and maintained for Mill Creek.

2) The TMDL includes a total allowable load as well as individual waste load allocations and load allocations.

Total Allowable Loads

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[3]Maptech, 2002. Fecal Coliform TMDL Development for Catoctin Creek Impairments, Virginia. April 23, 2002.

Virginia indicates that the total allowable loading of fecal coliform is the sum of the loads allocated to land based precipitation driven nonpoint source areas (forest and agricultural land segments), directly deposited nonpoint sources of fecal coliform (cattle in-stream, wildlife in-stream, and straight pipes), and point sources. Activities such as the application of manure and the direct deposition of wastes from grazing animals are considered fluxes to the land use categories. The actual value for the total fecal load can be found in Table 1 of this document. The total allowable load is calculated on an annual basis due to the nature of HSPF model.

Waste Load Allocations

Virginia has stated that there is one point source, Riner Sewage Treatment Plant (STP), on Mill Creek. This facility is allowed to discharge fecal coliform at a concentration of 200 cfu/100 mL. The STP has a design flow of 0.1 million gallons per day (mgd). The facility was given a WLA of 2.62E+11. The WLA was determined by multiplying the facility's allowable concentration (200 cfu/100 mL) by their permitted flow by the number of days in a year (365). It should be noted that the facility is often discharging fecal coliform at concentrations far lower than its permitted value. Therefore, the WLA may be over estimating the loading for this facility which would provide for an additional wildlife load.

EPA regulations require that an approvable TMDL include individual WLAs for each point source. According to 40 CFR 122.44(d)(1)(vii)(B), "Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA pursuant to 40 CFR 130.7." Furthermore, EPA has authority to object to the issuance of any National Pollutant Discharge Elimination System (NPDES) permit that is inconsistent with the WLAs established for that point source.

- Table 2 - Waste Load Allocations for Mill Creek

Facility	Permit Number	Existing Load	Allocated Load
Riner STP	VA0024040	2.62E+11	2.62E+11
Total	N/A	2.62E+11	2.62E+11

Load Allocations

According to Federal regulations at 40 CFR 130.2(g), LAs are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading. Wherever possible, natural and nonpoint

source loads should be distinguished.

In order to accurately simulate landscape processes and nonpoint source loadings, VADEQ used the HSPF model to represent the Mill Creek watershed. The HSPF model is a comprehensive modeling system for the simulation of watershed hydrology, point and nonpoint loadings, and receiving water quality for conventional pollutants and toxicants[4]. HSPF uses precipitation data for continuous and storm event simulation to determine total fecal loading to Mill Creek from the various land uses within the watershed. The total land loading of fecal coliform is the result of the application of manure and direct deposition from cattle, other livestock and wildlife (geese, deer, etc.), the deposition of fecal coliform from failed septic systems, and fecal coliform production from pets.

In addition, VADEQ recognizes the significance of fecal coliform from directly deposited sources such as cattle in-stream and wildlife in-stream. These sources are not dependent on a transport mechanism to reach a surface waterbody, and therefore, can impact water quality during low and high flow events. Please note that all of the values in Table 3 other than the direct deposit nonpoint sources (cattle in-stream and wildlife in-stream) are given in terms of colony forming units to the land surface. The amount of waste from the wet weather nonpoint sources reaching the stream is significantly lower than what appears in Table 3.

Table 3 - LA for the Land Application of Fecal Coliform

Land Use/Source	Existing Load	Allocated Load	Percent Reduction
Forest	4.89E+11	4.89E+11	0%
Low Density Residential	1.35E+12	1.35E+12	0%
Medium Density Residential	7.47E+11	7.47E+11	0%
Pasture/Hay	5.09E+14	4.02E+14	20%
Unimproved Pasture/Hay	2.50E+09	2.00E+09	20%
Row Crops	6.58E+11	5.26E+10	20%
Commercial, Industrial, Transportation	5.19E+10	5.19E+10	0%
Farmstead	7.27E+11	7.27E+11	0%
Septic Load	1.13E+11	0	100%
Cattle In-stream	4.25E+14	0	100%

[4] Supra, footnote 2.

Wildlife In-stream	6.66E+13	1.33E+13	80%

3) The TMDL considers the impacts of background pollution.

A background concentration was set by determining the wildlife loading to each land segment.

4) The TMDL considers critical environmental conditions.

According to the EPA regulation 40 CFR 130.7 (c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of Mill Creek is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards[5]. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable "worst-case" scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition because the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum. These critical conditions ensure that water quality standards will be met for other than worst case scenarios.

The sources of bacteria for these stream segments were a mixture of dry and wet weather driven sources. Therefore, the critical condition for Mill Creek was represented as a typical hydrologic year. Since the stream was modeled to attain the geometric mean standard and base and low flow events occurred far more often then wet weather events, it was essential that the standard be maintained during these periods.

5) The TMDLs consider seasonal environmental variations.

Seasonal variations involve changes in stream flow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flows normally occur in early spring from snow melt and spring rain, while seasonally low flows typically occur during the warmer summer and

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[5]EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

early fall drought periods. Consistent with our discussion regarding critical conditions, the HSPF model and TMDL analysis effectively considered seasonal environmental variations. The model also accounted for the seasonal variation in loading. Fecal coliform loads changed for many of the sources depending on the time of the year. For example, cattle spent more time in the stream in the summer and animals were confined for longer periods of time in the winter.

6) The TMDLs include a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. The margin of safety (MOS) may be implicit, built into the modeling process by using conservative modeling assumptions, or explicit, taken as a percentage of the WLA, LA, or TMDL.

Virginia includes an explicit margin of safety by establishing the TMDL target water quality concentration for fecal coliform at 190 cfu/ 100mL, which is more stringent than Virginia's water quality standard of 200 cfu/100 mL. This would be considered an explicit 5% margin of safety.

7) There is a reasonable assurance that the TMDL can be met.

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Nonpoint source controls to achieve LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program. Additionally, Virginia's Unified Watershed Assessment, an element of the Clean Water Action Plan, could provide assistance in implementing this TMDL.

The TMDL in its current form is designed to meet the applicable water quality standards. The Commonwealth intends to implement this TMDL through BMPs. The implementation of these practices will occur in stages. This is will allow the Commonwealth to monitor the benefits of the BMPs and determine which practices have the greatest impacts on water quality. It will also provide a mechanism for developing public support and checking the accuracy of the model. According to the Mill Creek TMDL model, a large portion of the fecal coliform loading to the stream came from in-stream sources. By staging the implementation of BMPs the Commonwealth will be able to verify the accuracy of the modeling assumptions.

The TMDL in its current form is designed to meet the applicable water quality standards. However, due to the wildlife issue that was previously mentioned, the Commonwealth believes that it

may be appropriate to modify its current standards to address the problems associated with wildlife loadings.

8) The TMDLs have been subject to public participation.

Three public meetings were held to discuss TMDL development on Mill Creek. All of the public meetings were public noticed in the *Virginia Register* and opened to at least a thirty-day comment period. The first meeting was held on December 04, 2001 in Riner, VA. Forty-three people attended this initial meeting on the TMDL. Twenty-two people attended the second meeting which was held in Riner, VA on February 19, 2002. The third and final public meeting was held in Riner, VA on March 26, 2002. Forty-eight people attended the third public meeting.

Attachment F

Effluent Data

Olver Laboratories Incorporated • Environmental Scientists and Consultants
1116 South Main Street, Suite 200 • Blacksburg, Virginia 24060
(540) 552-6974 • Fax: (540) 552-1715

Report No.: 17667 **Date Received:** 3/18/03 and 3/19/03
Report Date: 4/14/03
Client: Montgomery County Public Service Authority

Sample Number: 155962
Date Collected: 3/18/03
Time Collected: 8:30 AM
Description: Outfall 001
Wastewater Grab

Analysis	Result	QL*	SSTV	Units	Date/Time Analyzed	Analyst
Total Cyanide (EPA 335.2)	BQL	10.0	N/A	µg/L	3/19/03; 0815	kblevins
Dissolved Hexavalent Chromium (SM 3500Cr,D)	BQL	2	2	µg/L	3/18/03; 1420	mferguson
Dissolved Arsenic (EPA 200.9)	BQL	10	10	µg/L	3/26/03; 1230	tstiess
Dissolved Barium (EPA 200.7)	14	2	400	µg/L	4/01/03; 1530	mplott
Dissolved Cadmium (EPA 200.9)	BQL	0.1	0.5	µg/L	3/26/03; 1100	tstiess
Dissolved Chromium III (EPA 200.7)	BQL	1	150	µg/L	4/01/03; 1530	mplott
Dissolved Copper (EPA 200.7)	BQL	10	10	µg/L	4/01/03; 1530	mplott
Dissolved Iron (EPA 200.7)	BQL	50	50	µg/L	4/01/03; 1530	mplott
Dissolved Lead (EPA 200.9)	BQL	1	2	µg/L	3/27/03; 1100	tstiess
Dissolved Manganese (EPA 200.7)	9	5	10	µg/L	4/01/03; 1530	mplott
Dissolved Mercury (EPA 163.1)	BQL	0.01	0.01	µg/L	4/04/03; N.A.	scontra
Dissolved Nickel (EPA 200.7)	BQL	3	10	µg/L	4/01/03; 1530	mplott
Dissolved Selenium (EPA 200.9)	BQL	1	2	µg/L	3/27/03; 0900	tstiess
Dissolved Silver (EPA 200.7)	3	1	5	µg/L	4/03/03; 0930	mplott
Dissolved Zinc (EPA 200.7)	66	40	50	µg/L	4/01/03; 1530	mplott

* Quantitation Limit as depicted in VA Permit No. VA0024040. Where not specified, the QL is based on the MDL.

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Description: Outfall 001
Wastewater Grab

Analysis	Result	QL*	Units	Date/Time Analyzed	Analyst
Pesticides (EPA 608):				3/25/03; 1759	pwilliams
Aldrin	BQL	0.05	µg/L		
Chlordane	BQL	0.2	µg/L		
4,4'DDT	BQL	0.1	µg/L		
Arochlor-1016	BQL	1.0	µg/L		
Arochlor-1221	BQL	1.0	µg/L		
Arochlor-1232	BQL	1.0	µg/L		
Arochlor-1242	BQL	1.0	µg/L		
Arochlor-1248	BQL	1.0	µg/L		
Arochlor-1254	BQL	1.0	µg/L		
Arochlor-1260	BQL	1.0	µg/L		
Dieldrin	BQL	0.1	µg/L		
Endosulfan I	BQL	0.1	µg/L		
Endosulfan II	BQL	0.1	µg/L		
Endosulfan sulfate	BQL	0.1	µg/L		
Endrin	BQL	0.1	µg/L		
gamma-BHC (Lindane)	BQL	0.05	µg/L		
Heptachlor	BQL	0.05	µg/L		
Methoxychlor	BQL	0.2	µg/L		
Mirex	BQL	0.2	µg/L		
Toxaphene	BQL	5.0	µg/L		

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Report Date: 4/14/03
Client: Montgomery County Public Service Authority

Sample Number: 155962
Date Collected: 3/18/03
Time Collected: 8:30 AM
Description: Outfall 001
Wastewater Grab

Analysis	Result	QL*	Units	Date/Time Analyzed	Analyst
Pesticides (EPA 622 mod.):				3/27/03; 1628	dfaircloth
Chlorpyrifos	BQL	0.5	µg/L		
Demeton	BQL	0.5	µg/L		
Guthion	BQL	0.5	µg/L		
Malathion	BQL	0.5	µg/L		
Parathion	BQL	0.5	µg/L		
Herbicides (SW-846 8151A) :				3/31/03; 1405	dfaircloth
2,4-D	BQL	2.0	µg/L		
Silvex	BQL	0.75	µg/L		
Base Neutral Extractables (EPA 625):				3/20/03; 1414	pwilliams
1,2-Dichlorobenzene	BQL	10.0	µg/L		
1,3-Dichlorobenzene	BQL	10.0	µg/L		
1,4-Dichlorobenzene	BQL	10.0	µg/L		
2,4-Dinitrotoluene	BQL	10.0	µg/L		
Anthracene	BQL	10.0	µg/L		
Benzo(a)anthracene	BQL	10.0	µg/L		
Benzo(a)pyrene	BQL	10.0	µg/L		
Benzo(b)fluoranthene	BQL	10.0	µg/L		
Benzo(k)fluoranthene	BQL	10.0	µg/L		
Bis(2-ethylhexyl)phthalate	BQL	10.0	µg/L		
Chrysene	BQL	10.0	µg/L		
Dibenzo(a,h)anthracene	BQL	20.0	µg/L		
Fluoranthene	BQL	10.0	µg/L		
Fluorene	BQL	10.0	µg/L		
Indeno(1,2,3-cd)pyrene	BQL	20.0	µg/L		

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Report No.: 17667 **Date Received:** 3/18/03 and 3/19/03
Report Date: 4/14/03
Client: Montgomery County Public Service Authority

Sample Number: 155962
Date Collected: 3/18/03
Time Collected: 8:30 AM
Description: Outfall 001
Wastewater Grab

MAY 12 [illegible]
[illegible]-NORO

Analysis	Result	QL*	Units	Date/Time Analyzed	Analyst
Base Neutral Extractables (EPA 625) (continued):				3/20/03; 1414	pwilliams
Isophorone	BQL	10.0	µg/L		
Naphthalene	BQL	10.0	µg/L		
Pyrene	BQL	10.0	µg/L		
Acid Extractables (EPA 625):				3/20/03; 1414	pwilliams
2,4,6-Trichlorophenol	BQL	10.0	µg/L		
Pentachlorophenol	BQL	50.0	µg/L		
Phenol	BQL	10.0	µg/L		
Volatile Organic Compounds (EPA 624):				3/20/03; 1203	bpukanecz
Benzene	BQL	10.0	µg/L		
Bromoform	BQL	10.0	µg/L		
Carbon Tetrachloride	BQL	10.0	µg/L		
Chlorodibromomethane	BQL	10.0	µg/L		
Chloroform	BQL	10.0	µg/L		
Chloromethane	BQL	20.0	µg/L		
Dichloromethane	BQL	20.0	µg/L		
Dichlorobromomethane	BQL	10.0	µg/L		
1,2-Dichloroethane	BQL	10.0	µg/L		
Ethylbenzene	BQL	10.0	µg/L		
Monochlorobenzene	BQL	50.0	µg/L		
Tetrachloroethylene	BQL	10.0	µg/L		
Toluene	BQL	10.0	µg/L		
Trichloroethylene	BQL	10.0	µg/L		
Vinyl Chloride	BQL	10.0	µg/L		
Xylenes (SW-846 8021B)	BQL	1.0	µg/L	3/25/03; 1201	bpukanecz

* Quantitation Limit as depicted in VA Permit No. VA0024040. Where not specified, the QL is based on the MDL.

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(540) 552-6974 • Fax: (540) 552-1715

Report No.: 17667 **Date Received:** 3/18/03 and 3/19/03
Report Date: 4/14/03
Client: Montgomery County Public Service Authority

Sample Number: 156004
Date Collected: 3/18/03 - 3/19/03
Time Collected: 7:00 AM – 7:00 AM
Description: Outfall 001
Wastewater Composite

Analysis	Result	QL*	SSTV	Units	Date/Time Analyzed	Analyst
Sulfate (EPA 300.0)	204,000	100,000**	N/A	µg/L	3/20/03; 1320	kblevins

* Quantitation Limit as depicted in VA Permit No. VA0024040. Where not specified, the QL is based on the MDL.
** Sample required dilution; QL was raised accordingly.

EMS, Inc.
Environmental Management Services
Laboratory Services - Plant Operations - Consultants
P.O. Box 784 Wytheville, VA 24382
Phone (276) 228-6464 Fax (276) 228-2325
E-mail: emslab@wiredog.com

Sample No.: 08-1985 **Report Date:** 08-13-08

CHAIN OF CUSTODY INFORMATION

Client: Montgomery County PSA

Attention: Bob Fronk / Bruce Jones

Sample Source: Meadow Creek **Description:** Water

Date/Time Collected: 08-11-08/0820 **Collected By:** Bruce Jones

Delivered To Laboratory By: Bruce Jones **Received By:** Gary M. Johnson

Date/Time Received At Laboratory: 08-11-08/1030 **Preservation:** Cold, HNO_3

ANALYTICAL DATA

Parameter	Result	Method	Date/Time Analyzed	Analyst
Dissolved Copper, ug/L	1.61	EPA 200.8	08-12-08/1814	SC*
Dissolved Zinc, ug/L	7.26	EPA 200.8	08-12-08/1814	SC*

* Analysis Subcontracted

Note: Sample was filtered by the client at the time of collection.

By: Gary M. Johnson

DEQ LAB I.D. NO. 000110 DCLS LAB I.D. NO. 00102 US EPA LAB CODE I.D. VA01164

EMS, Inc.
Environmental Management Services
Laboratory Services - Plant Operations - Consultants
P.O. Box 784 Wytheville, VA 24382
Phone (276) 228-6464 Fax (276) 228-2325
E-mail: emslab@wiredog.com

Sample No.: 08-1984 **Report Date:** 08-13-08

CHAIN OF CUSTODY INFORMATION

Client: Montgomery County PSA

Attention: Bob Fronk / Bruce Jones

Sample Source: Riner WWTP Outfall 001 **Description:** Effluent

Date/Time Collected: 08-11-08/0810 **Collected By:** Bruce Jones

Delivered To Laboratory By: Bruce Jones **Received By:** Gary M. Johnson

Date/Time Received At Laboratory: 08-11-08/1030 **Preservation:** Cold, HNO_3

ANALYTICAL DATA

Parameter	Result	Method	Date/Time Analyzed	Analyst
Copper, ug/L	25.4	EPA 200.8	08-12-08/1814	SC*
Zinc, ug/L	88.4	EPA 200.8	08-12-08/1814	SC*

total recoverable

* Analysis Subcontracted

By: Gary M. Johnson

DEQ LAB I.D. NO. 000110 DCLS LAB I.D. NO. 00102 US EPA LAB CODE I.D VA01164

Riner WWTP
VA0024040

Effluent Dissolved Copper

Date	µg/L
4/18/2008	12

Effluent Dissolved Silver

Date	µg/L
4/9/2008	<0.002

Effluent Dissolved Zinc

Date	µg/L
9/26/2006	173
9/26/2006	232
12/5/2006	113
3/6/2007	103
6/5/2007	141
9/11/2007	75
12/11/2007	109
3/4/2008	101

Riner WWTP (VA0024040)

Effluent pH (S.U.)

Date Due	min	max
10-Aug-07	7.2	7.5
10-Sep-07	7	7.6
10-Oct-07	7	7.4
10-Nov-07	6.9	7.4
10-Dec-07	7	7.5
10-Jan-08	6.9	7.5
10-Feb-08	6.8	7.3
10-Mar-08	6.9	7.4
10-Apr-08	6.8	7.3
10-May-08	6.8	7.4
10-Jun-08	6.8	7.3
10-Jul-08	7.0	7.4

90th percentil pH	7.5 S.U.
10th percentile pH	6.8 S.U.

Riner WWTP
VA0024040

Effluent Temperatures °C

	2007										2008	
Day	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**
1	14	17.3	20.9	21.8	22.8	22.6	18.3	13.9	10.9	10.3	8	7
2	15.7	18.1	21	21.3	23.2	22.5	18	14.1	11.2	7.1	8.6	7
3	14.9	17.7	20.4	21.5	23.1	22	19.2	13.2	10.5	7.2	8.5	10.2
4	15.9	15.9	20.2	21.7	23	22.3	20.4	13.3	10	6.9	9	12
5	13.6	15.7	20.3	22.1	24	21.9	21.7	13.7	9.6	7.1	10.6	11.8
6	12.6	15.4	20	22.8	23.6	22.3	22	12.7	9.8	8.6	12	9.9
7	10.7	14.8	20	22.9	23.5	22.6	21	12.5	9.6	9.8	12.3	11.5
8	9.3	15.6	20.6	23	23.7	22.7	21.5	11.4	9	10.1	10.9	11.7
9	9.6	16.5	22.2	23.5	23.9	22.5	21.2	11.7	11	11.8	9.5	9.4
10	10	17	21.5	23.7	24.2	22.7	21.2	11.5	13.5	10.4	9	9.3
11	10.8	18.8	22.5	23.5	24	23.5	19.8	12.4	13.5	11.8	8.5	9.6
12	10.8	19	21.5	22.9	23.5	22.3	18.3	12.1	14.6	8.3	8	10.3
13	11	19	21.6	21.9	23.9	21.5	16.6	13.5	14.4	8.4	8.8	10.2
14	11.8	17.8	20.9	22	23.1	22	16.4	14.3	13.8	9	7.1	11.2
15	12.3	18.6	19.7	22	22.5	21.5	17	14.5	12.2	7.3	9.2	12.1
16	11	18.9	20	22.5	22.9	20	16.9	13.3	10.9	8.5	9.4	12
17	11.2	17.5	21	22.6	23.3	19.2	17.9	12	9.7	8	10	11.2
18	11.8	17.6	20.8	22.7	23.5	18.9	19.2	11	8.2	8.4	11.9	11.2
19	12.7	15.6	21.9	22.7	23.1	19.1	20	12.4	9.2	6.5	10.4	12.9
20	13	16.1	22.3	22.8	23.1	19.4	17.7	13.7	9	5.5	9.9	12.5
21	12	17.3	21.2	22.1	23.8	20.4	17.3	14.3	9.1	6.2	7.8	12.2
22	13	18.1	21.5	21.3	23.8	20.8	16.5	13.9	9.7	4.9	8.6	11
23	14.7	19.1	21.3	20.8	24	21.3	18.3	13.5	10	7.2	9.9	11.2
24	15.9	18.9	21.9	20.4	24.8	21.6	19.6	11.3	9.4	6.5	9.2	11.5
25	16.8	19.3	21.7	20.2	25	21.1	18.5	11	9.6	6.5	9.2	9.4
26	16.8	19	22.6	20.6	25.5	22	17.7	12.8	8.9	7.2	9.2	11.6
27	17.5	21	23	21.1	24.4	22.4	17	11.8	9.5	7.7	9	12
28	16.8	21	23	21.4	23.8	21.1	17	12	10	7.9	7.7	14
29	16.1	20.8	23.1	21.8	23.8	20	15.3	10.9	11	7	8.3	12.4
30	16.4	21.1	22.8	22.8	24.5	18.9	13.9	10.3	10.8	8.2		12.1
31		21.2		22.9	23.5		14		10	7.1		12.1
Total	398.7	560	641.4	685.3	734.8	641.1	569.4	379	328.6	247.4	270.5	342.5
Average	13	18	21	22	24	21	18	13	11	8	9	11

90th Percentile Temperature 22.9 °C
90th Percentile Temperature 18.1 °C January - May (high flow months)

7/9/2008 11:28:12 AM

Facility = Riner WWTP
Chemical = ammonia effluent baseline
Chronic averaging period = 30
WLAa = 2.9
WLAc = 0.71
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 13
Expected Value = .199773
Variance = .014367
C.V. = 0.6
97th percentile daily values = .486132
97th percentile 4 day average = .332381
97th percentile 30 day average= .240937
< Q.L. = 8
Model used = BPJ Assumptions, Type 1 data

~~No Limit is required for this material~~

The data are:

0
0.6
0
0
0
0
0.3
0
0.2
0
1.27
0.2
0

Riner WWTP
VA0024040

Effluent Hardness

Date	mg/L
9/26/2006	232
12/5/2006	190
3/6/2007	188
6/5/2007	204
9/14/2007	201
12/13/2007	262
3/6/2008	197
Mean	211

Attachment G

Wasteload and Limit Calculations

- Mixing Zone Calculations (MIXER 2.1)
- Antidegradation Wasteload Allocation Spreadsheet
- STATS Program Results (ammonia, copper, TRC, zinc)

Mixing Zone Predictions for Riner WWTP

Effluent Flow = 0.10 MGD
Stream 7Q10 = 0.11 MGD
Stream 30Q10 = 0.14 MGD
Stream 1Q10 = 0.10 MGD
Stream slope = 0.01 ft/ft
Stream width = 2.1 ft
Bottom scale = 1
Channel scale = 3

Mixing Zone Predictions @ 7Q10

Depth = .1804 ft
Length = 17.38 ft
Velocity = .8568 ft/sec
Residence Time = .0002 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1966 ft
Length = 16.03 ft
Velocity = .8991 ft/sec
Residence Time = .0002 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1751 ft
Length = 17.85 ft
Velocity = .8417 ft/sec
Residence Time = .0059 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Riner WWTP Permit No.: VA0024040

Receiving Stream: Mill Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	212 mg/L	1Q10 (Annual) =	0.1 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	211 mg/L
90% Temperature (Annual) =	19.2 deg C	7Q10 (Annual) =	0.11 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	22.9 deg C
90% Temperature (Wet season) =	16.5 deg C	30Q10 (Annual) =	0.14 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	18.1 deg C
90% Maximum pH =	8.3 SU	1Q10 (Wet season) =	0.18 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7.5 SU
10% Maximum pH =	7.5 SU	30Q10 (Wet season)	0.31 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6.8 SU
Tier Designation (1 or 2) =	2	30Q5 =	0.17 MGD			Discharge Flow =	0.1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0.45 MGD				
Trout Present Y/N? =	N	Annual Average =	MGD				
Early Life Stages Present Y/N? =	Y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	7.3E+03	--	--	na	2.7E+02	--	--	na	7.3E+02	--	--	na	**7.3E+02**
Acrolein	0	--	--	na	7.8E+02	--	--	na	2.1E+03	--	--	na	7.8E+01	--	--	na	2.1E+02	--	--	na	**2.1E+02**
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	3.6E+01	--	--	na	6.6E-01	--	--	na	3.6E+00	--	--	na	**3.6E+00**
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	6.0E+00	--	na	7.7E-03	7.5E-01	--	na	1.4E-04	1.5E+00	--	na	7.7E-04	**1.5E+00**	--	na	**7.7E-04**
Ammonia-N (mg/l) (Yearly)	0	1.36E+01	2.15E+00	na	--	2.7E+01	5.2E+00	na	--	3.39E+00	5.37E-01	na	--	6.8E+00	1.3E+00	na	--	**6.8E+00**	**1.3E+00**	na	--
Ammonia-N (mg/l) (High Flow)	0	1.13E+01	2.28E+00	na	--	3.2E+01	9.3E+00	na	--	2.83E+00	5.69E-01	na	--	7.9E+00	2.3E+00	na	--	**7.9E+00**	**2.3E+00**	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	3.0E+05	--	--	na	1.1E+04	--	--	na	3.0E+04	--	--	na	**3.0E+04**
Antimony	0	--	--	na	4.3E+03	--	--	na	1.2E+04	--	--	na	4.3E+02	--	--	na	1.2E+03	--	--	na	**1.2E+03**
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.2E+02	na	--	8.5E+01	3.8E+01	na	--	1.7E+02	7.9E+01	na	--	**1.7E+02**	**7.9E+01**	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	3.9E+03	--	--	na	7.1E+01	--	--	na	3.9E+02	--	--	na	**3.9E+02**
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	3.0E-02	--	--	na	5.4E-04	--	--	na	3.0E-03	--	--	na	**3.0E-03**
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	**2.7E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	**2.7E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	**2.7E-01**
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	**2.7E-01**
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	3.8E+01	--	--	na	1.4E+00	--	--	na	3.8E+00	--	--	na	**3.8E+00**
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	4.6E+05	--	--	na	1.7E+04	--	--	na	4.6E+04	--	--	na	**4.6E+04**
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	2.0E+04	--	--	na	3.6E+02	--	--	na	2.0E+03	--	--	na	**2.0E+03**
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	1.4E+04	--	--	na	5.2E+02	--	--	na	1.4E+03	--	--	na	**1.4E+03**
Cadmium	0	9.1E+00	2.0E+00	na	--	1.8E+01	4.3E+00	na	--	2.3E+00	5.1E-01	na	--	4.6E+00	1.1E+00	na	--	**4.6E+00**	**1.1E+00**	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	2.4E+02	--	--	na	4.4E+00	--	--	na	2.4E+01	--	--	na	**2.4E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	4.8E+00	9.0E-03	na	1.2E-01	6.0E-01	1.1E-03	na	2.2E-03	1.2E+00	2.3E-03	na	1.2E-02	**1.2E+00**	**2.3E-03**	na	**1.2E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.8E+05	na	--	2.2E+05	5.8E+04	na	--	4.3E+05	1.2E+05	na	--	**4.3E+05**	**1.2E+05**	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.3E+01	na	--	4.8E+00	2.8E+00	na	--	9.5E+00	5.8E+00	na	--	**9.5E+00**	**5.8E+00**	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	5.7E+04	--	--	na	2.1E+03	--	--	na	5.7E+03	--	--	na	**5.7E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	1.9E+03	--	--	na	3.4E+01	--	--	na	1.9E+02	--	--	na	1.9E+02
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	1.6E+05	--	--	na	2.9E+03	--	--	na	1.6E+04	--	--	na	1.6E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	1.2E+04	--	--	na	4.3E+02	--	--	na	1.2E+03	--	--	na	1.2E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	1.1E+03	--	--	na	4.0E+01	--	--	na	1.1E+02	--	--	na	1.1E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.6E-02	na	--	2.1E-02	1.0E-02	na	--	4.2E-02	2.2E-02	na	--	**4.2E-02**	**2.2E-02**	na	--
Chromium III	0	1.1E+03	1.4E+02	na	--	2.1E+03	2.9E+02	na	--	2.6E+02	3.4E+01	na	--	5.3E+02	7.2E+01	na	--	**5.3E+02**	**7.2E+01**	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.3E+01	na	--	4.0E+00	2.8E+00	na	--	8.0E+00	5.8E+00	na	--	**8.0E+00**	**5.8E+00**	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	2.7E-01
Copper	1.61	2.7E+01	1.7E+01	na	--	5.3E+01	3.4E+01	na	--	8.0E+00	5.5E+00	na	--	1.4E+01	9.7E+00	na	--	**1.4E+01**	**9.7E+00**	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	4.4E+01	1.1E+01	na	5.8E+05	5.5E+00	1.3E+00	na	2.2E+04	1.1E+01	2.7E+00	na	5.8E+04	**1.1E+01**	**2.7E+00**	na	**5.8E+04**
DDD [C]	0	--	--	na	8.4E-03	--	--	na	4.6E-02	--	--	na	8.4E-04	--	--	na	4.6E-03	--	--	na	**4.6E-03**
DDE [C]	0	--	--	na	5.9E-03	--	--	na	3.2E-02	--	--	na	5.9E-04	--	--	na	3.2E-03	--	--	na	**3.2E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	2.2E+00	2.1E-03	na	3.2E-02	2.8E-01	2.5E-04	na	5.9E-04	5.5E-01	5.3E-04	na	3.2E-03	**5.5E-01**	**5.3E-04**	na	**3.2E-03**
Demeton	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	2.5E-02	na	--	--	5.3E-02	na	--	--	**5.3E-02**	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	na	**2.7E-01**
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	3.2E+04	--	--	na	1.2E+03	--	--	na	3.2E+03	--	--	na	**3.2E+03**
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	8.8E+04	--	--	na	1.6E+03	--	--	na	8.8E+03	--	--	na	**8.8E+03**
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	4.6E+04	--	--	na	1.7E+03	--	--	na	4.6E+03	--	--	na	**4.6E+03**
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	7.0E+03	--	--	na	2.6E+02	--	--	na	7.0E+02	--	--	na	**7.0E+02**
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	7.0E+03	--	--	na	2.6E+02	--	--	na	7.0E+02	--	--	na	**7.0E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	4.2E+00	--	--	na	7.7E-02	--	--	na	4.2E-01	--	--	na	**4.2E-01**
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	2.5E+03	--	--	na	4.6E+01	--	--	na	2.5E+02	--	--	na	**2.5E+02**
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	5.4E+03	--	--	na	9.9E+01	--	--	na	5.4E+02	--	--	na	**5.4E+02**
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	4.6E+04	--	--	na	1.7E+03	--	--	na	4.6E+03	--	--	na	**4.6E+03**
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	3.8E+05	--	--	na	1.4E+04	--	--	na	3.8E+04	--	--	na	**3.8E+04**
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	2.1E+03	--	--	na	7.9E+01	--	--	na	2.1E+02	--	--	na	**2.1E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	2.1E+03	--	--	na	3.9E+01	--	--	na	2.1E+02	--	--	na	**2.1E+02**
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	4.6E+03	--	--	na	1.7E+02	--	--	na	4.6E+02	--	--	na	**4.6E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	4.8E-01	1.2E-01	na	7.7E-03	6.0E-02	1.4E-02	na	1.4E-04	1.2E-01	2.9E-02	na	7.7E-04	**1.2E-01**	**2.9E-02**	na	**7.7E-04**
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	3.2E+05	--	--	na	1.2E+04	--	--	na	3.2E+04	--	--	na	**3.2E+04**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	3.2E+02	--	--	na	5.9E+00	--	--	na	3.2E+01	--	--	na	**3.2E+01**
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	6.2E+03	--	--	na	2.3E+02	--	--	na	6.2E+02	--	--	na	**6.2E+02**
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	7.8E+06	--	--	na	2.9E+05	--	--	na	7.8E+05	--	--	na	**7.8E+05**
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	3.2E+04	--	--	na	1.2E+03	--	--	na	3.2E+03	--	--	na	**3.2E+03**
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	3.8E+04	--	--	na	1.4E+03	--	--	na	3.8E+03	--	--	na	**3.8E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	2.1E+03	--	--	na	7.7E+01	--	--	na	2.1E+02	--	--	na	**2.1E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	5.0E+02	--	--	na	9.1E+00	--	--	na	5.0E+01	--	--	na	**5.0E+01**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	na	1.2E-07	--	--	na	1.2E-07	--	--	na	**na**
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	3.0E+01	--	--	na	5.4E-01	--	--	na	3.0E+00	--	--	na	**3.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	4.4E-01	1.2E-01	na	6.5E+02	5.5E-02	1.4E-02	na	2.4E+01	1.1E-01	2.9E-02	na	6.5E+01	**1.1E-01**	**2.9E-02**	na	**6.5E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	4.4E-01	1.2E-01	na	6.5E+02	5.5E-02	1.4E-02	na	2.4E+01	1.1E-01	2.9E-02	na	6.5E+01	**1.1E-01**	**2.9E-02**	na	**6.5E+01**
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	6.5E+02	--	--	na	2.4E+01	--	--	na	6.5E+01	--	--	na	**6.5E+01**
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	1.7E-01	7.6E-02	na	2.2E+00	2.2E-02	9.0E-03	na	8.1E-02	4.3E-02	1.9E-02	na	2.2E-01	**4.3E-02**	**1.9E-02**	na	**2.2E-01**
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	2.2E+00	--	--	na	8.1E-02	--	--	na	2.2E-01	--	--	na	**2.2E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	7.8E+04	--	--	na	2.9E+03	--	--	na	7.8E+03	--	--	**na**	**7.8E+03**
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	1.0E+03	--	--	na	3.7E+01	--	--	na	1.0E+02	--	--	**na**	**1.0E+02**
Fluorene	0	--	--	na	1.4E+04	--	--	na	3.8E+04	--	--	na	1.4E+03	--	--	na	3.8E+03	--	--	**na**	**3.8E+03**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Guthion	0	--	1.0E-02	na	--	--	2.1E-02	na	--	--	2.5E-03	na	--	--	5.3E-03	na	--	--	**5.3E-03**	**na**	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	1.0E+00	8.0E-03	na	1.2E-02	1.3E-01	9.5E-04	na	2.1E-04	2.6E-01	2.0E-03	na	1.2E-03	**2.6E-01**	**2.0E-03**	**na**	**1.2E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	1.1E-03	1.0E+00	8.0E-03	na	6.1E-03	1.3E-01	9.5E-04	na	1.1E-04	2.6E-01	2.0E-03	na	6.1E-04	**2.6E-01**	**2.0E-03**	**na**	**6.1E-04**
Hexachlorobenzene[C]	0	--	--	na	7.7E-03	--	--	na	4.2E-02	--	--	na	7.7E-04	--	--	na	4.2E-03	--	--	**na**	**4.2E-03**
Hexachlorobutadiene[C]	0	--	--	na	5.0E+02	--	--	na	2.8E+03	--	--	na	5.0E+01	--	--	na	2.8E+02	--	--	**na**	**2.8E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	1.3E-01	--	--	na	7.2E-01	--	--	na	1.3E-02	--	--	na	7.2E-02	--	--	**na**	**7.2E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	4.6E-01	--	--	na	2.5E+00	--	--	na	4.6E-02	--	--	na	2.5E-01	--	--	**na**	**2.5E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	6.3E-01	1.9E+00	--	na	3.5E+00	2.4E-01	--	na	6.3E-02	4.8E-01	--	na	3.5E-01	**4.8E-01**	--	**na**	**3.5E-01**
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	4.6E+04	--	--	na	1.7E+03	--	--	na	4.6E+03	--	--	**na**	**4.6E+03**
Hexachloroethane[C]	0	--	--	na	8.9E+01	--	--	na	4.9E+02	--	--	na	8.9E+00	--	--	na	4.9E+01	--	--	**na**	**4.9E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.2E+00	na	--	--	5.0E-01	na	--	--	1.1E+00	na	--	--	**1.1E+00**	**na**	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	2.7E+00	--	--	na	4.9E-02	--	--	na	2.7E-01	--	--	**na**	**2.7E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Isophorone[C]	0	--	--	na	2.6E+04	--	--	na	1.4E+05	--	--	na	2.6E+03	--	--	na	1.4E+04	--	--	**na**	**1.4E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	**0.0E+00**	**na**	--
Lead	0	3.1E+02	3.5E+01	na	--	6.2E+02	7.4E+01	na	--	7.7E+01	8.8E+00	na	--	1.5E+02	1.8E+01	na	--	**1.5E+02**	**1.8E+01**	**na**	--
Malathion	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	2.5E-02	na	--	--	5.3E-02	na	--	--	**5.3E-02**	**na**	--
Manganese	78.9	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	2.8E+00	1.6E+00	na	1.4E-01	3.5E-01	1.9E-01	na	5.1E-03	7.0E-01	4.0E-01	na	1.4E-02	**7.0E-01**	**4.0E-01**	**na**	**1.4E-02**
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	1.1E+04	--	--	na	4.0E+02	--	--	na	1.1E+03	--	--	**na**	**1.1E+03**
Methoxychlor	0	--	3.0E-02	na	--	--	6.3E-02	na	--	--	7.5E-03	na	--	--	1.6E-02	na	--	--	**1.6E-02**	**na**	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	**0.0E+00**	**na**	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	5.7E+04	--	--	na	2.1E+03	--	--	na	5.7E+03	--	--	**na**	**5.7E+03**
Nickel	0	3.4E+02	3.8E+01	na	4.6E+03	6.9E+02	8.0E+01	na	1.2E+04	8.6E+01	9.5E+00	na	4.6E+02	1.7E+02	2.0E+01	na	1.2E+03	**1.7E+02**	**2.0E+01**	**na**	**1.2E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	5.1E+03	--	--	na	1.9E+02	--	--	na	5.1E+02	--	--	**na**	**5.1E+02**
N-Nitrosodimethylamine[C]	0	--	--	na	8.1E+01	--	--	na	4.5E+02	--	--	na	8.1E+00	--	--	na	4.5E+01	--	--	**na**	**4.5E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	1.6E+02	--	--	na	8.8E+02	--	--	na	1.6E+01	--	--	na	8.8E+01	--	--	**na**	**8.8E+01**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	1.4E+01	--	--	na	7.7E+01	--	--	na	1.4E+00	--	--	na	7.7E+00	--	--	**na**	**7.7E+00**
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.7E-02	na	--	1.6E-02	3.3E-03	na	--	3.3E-02	6.8E-03	na	--	**3.3E-02**	**6.8E-03**	**na**	--
PCB-1016	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1221	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1232	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1242	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1248	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1254	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB-1260	0	--	1.4E-02	na	--	--	2.9E-02	na	--	--	3.5E-03	na	--	--	7.4E-03	na	--	--	**7.4E-03**	**na**	--
PCB Total[C]	0	--	--	na	1.7E-03	--	--	na	9.4E-03	--	--	na	1.7E-04	--	--	na	9.4E-04	--	--	**na**	**9.4E-04**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Pentachlorophenol [C]	0	8.9E+00	6.9E+00	na	8.2E+01	1.8E+01	1.5E+01	na	4.5E+02	2.2E+00	1.7E+00	na	8.2E+00	4.5E+00	3.6E+00	na	4.5E+01	**4.5E+00**	**3.6E+00**	**na**	**4.5E+01**
Phenol	0	--	--	na	4.6E+06	--	--	na	1.2E+07	--	--	na	4.6E+05	--	--	na	1.2E+06	--	--	**na**	**1.2E+06**
Pyrene	0	--	--	na	1.1E+04	--	--	na	3.0E+04	--	--	na	1.1E+03	--	--	na	3.0E+03	--	--	**na**	**3.0E+03**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	4.1E+01	--	--	na	1.5E+00	--	--	na	4.1E+00	--	--	**na**	**4.1E+00**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.1E+01	--	--	na	4.0E-01	--	--	na	1.1E+00	--	--	**na**	**1.1E+00**
Strontium-90	0	--	--	na	8.0E+00	--	--	na	2.2E+01	--	--	na	8.0E-01	--	--	na	2.2E+00	--	--	**na**	**2.2E+00**
Tritium	0	--	--	na	2.0E+04	--	--	na	5.4E+04	--	--	na	2.0E+03	--	--	na	5.4E+03	--	--	**na**	**5.4E+03**
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	4.0E+01	1.1E+01	na	3.0E+04	5.0E+00	1.3E+00	na	1.1E+03	1.0E+01	2.6E+00	na	3.0E+03	**1.0E+01**	**2.6E+00**	**na**	**3.0E+03**
Silver	0	1.3E+01	--	na	--	2.5E+01	--	na	--	3.1E+00	--	na	--	6.3E+00	--	na	--	**6.3E+00**	--	**na**	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	1.1E+02	--	--	na	6.1E+02	--	--	na	1.1E+01	--	--	na	6.1E+01	--	--	**na**	**6.1E+01**
Tetrachloroethylene[C]	0	--	--	na	8.9E+01	--	--	na	4.9E+02	--	--	na	8.9E+00	--	--	na	4.9E+01	--	--	**na**	**4.9E+01**
Thallium	0	--	--	na	6.3E+00	--	--	na	1.7E+01	--	--	na	6.3E-01	--	--	na	1.7E+00	--	--	**na**	**1.7E+00**
Toluene	0	--	--	na	2.0E+05	--	--	na	5.4E+05	--	--	na	2.0E+04	--	--	na	5.4E+04	--	--	**na**	**5.4E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	1.5E+00	4.2E-04	na	4.1E-02	1.8E-01	5.0E-05	na	7.5E-04	3.7E-01	1.1E-04	na	4.1E-03	**3.7E-01**	**1.1E-04**	**na**	**4.1E-03**
Tributyltin	0	4.6E-01	6.3E-02	na	--	9.2E-01	1.3E-01	na	--	1.2E-01	1.6E-02	na	--	2.3E-01	3.3E-02	na	--	**2.3E-01**	**3.3E-02**	**na**	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	2.5E+03	--	--	na	9.4E+01	--	--	na	2.5E+02	--	--	**na**	**2.5E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	4.2E+02	--	--	na	2.3E+03	--	--	na	4.2E+01	--	--	na	2.3E+02	--	--	**na**	**2.3E+02**
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	4.5E+03	--	--	na	8.1E+01	--	--	na	4.5E+02	--	--	**na**	**4.5E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	3.6E+02	--	--	na	6.5E+00	--	--	na	3.6E+01	--	--	**na**	**3.6E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	**na**	--
Vinyl Chloride[C]	0	--	--	na	6.1E+01	--	--	na	3.4E+02	--	--	na	6.1E+00	--	--	na	3.4E+01	--	--	**na**	**3.4E+01**
Zinc	7.26	2.2E+02	2.2E+02	na	6.9E+04	4.3E+02	4.6E+02	na	1.9E+05	6.1E+01	6.1E+01	na	6.9E+03	1.1E+02	1.2E+02	na	1.9E+04	**1.1E+02**	**1.2E+02**	**na**	**1.9E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	1.2E+03
Arsenic	4.7E+01
Barium	na
Cadmium	6.4E-01
Chromium III	4.3E+01
Chromium VI	3.2E+00
Copper	5.8E+00
Iron	na
Lead	1.1E+01
Manganese	na
Mercury	1.4E-02
Nickel	1.2E+01
Selenium	1.6E+00
Silver	2.5E+00
Zinc	4.6E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.100 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGI 0.100

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.100	0.180	0.200	0.280
7Q10	0.110	N/A	0.210	N/A
30Q10	0.140	0.310	0.240	0.410
30Q5	0.170	N/A	0.270	N/A
Harm. Mean	0.450	N/A	0.550	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	21.050	17.071
30Q10 90th% Temp. Mix (deg C)	20.742	16.890
1Q10 90th% pH Mix (SU)	7.737	7.838
30Q10 90th% pH Mix (SU)	7.793	7.939
1Q10 10th% pH Mix (SU)	7.022	N/A
7Q10 10th% pH Mix (SU)	7.036	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	211.5	211.5
7Q10 Hardness (mg/L as CaCO3)	211.5	211.5

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.737
(7.204 - pH)	-0.533
(pH - 7.204)	0.533
Trout Present Criterion (mg N/I	9.050
Trout Absent Criterion (mg N/L	13.551
Trout Present?	N
Effective Criterion (mg N/L)	13.551

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	20.742
90th Percentile pH (SU)	7.793
MIN	1.908
MAX	20.742
(7.688 - pH)	-0.105
(pH - 7.688)	0.105
Early LS Present Criterion (mg N	2.148
Early LS Absent Criterion (mg N/	2.148
Early Life Stages Present?	Y
Effective Criterion (mg N/L)	2.148

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.838
(7.204 - pH)	-0.634
(pH - 7.204)	0.634
Trout Present Criterion (mg N/I	7.572
Trout Absent Criterion (mg N/L	11.338
Trout Present?	N
Effective Criterion (mg N/L)	11.338

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.890
90th Percentile pH (SU)	7.939
MIN	2.446
MAX	16.890
(7.688 - pH)	-0.251
(pH - 7.688)	0.251
Early LS Present Criterion (mg N	2.276
Early LS Absent Criterion (mg N/	2.276
Early Life Stages Present?	Y
Effective Criterion (mg N/L)	2.276

0.100 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGI 0.100

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.100	0.180	0.200	0.280
7Q10	0.110	N/A	0.210	N/A
30Q10	0.140	0.310	0.240	0.410
30Q5	0.170	N/A	0.270	N/A
Harm. Mean	0.450	N/A	0.550	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	21.050	17.071
30Q10 90th% Temp. Mix (deg C)	20.742	16.890
1Q10 90th% pH Mix (SU)	7.737	7.838
30Q10 90th% pH Mix (SU)	7.793	7.939
1Q10 10th% pH Mix (SU)	7.022	N/A
7Q10 10th% pH Mix (SU)	7.036	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	211.500	211.500
7Q10 Hardness (mg/L as CaCO3) =	211.524	211.524

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.737
(7.204 - pH)	-0.533
(pH - 7.204)	0.533
Trout Present Criterion (mg N/I	9.050
Trout Absent Criterion (mg N/L	13.551
Trout Present?	N
Effective Criterion (mg N/L)	13.551

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	20.742
90th Percentile pH (SU)	7.793
MIN	1.908
MAX	20.742
(7.688 - pH)	-0.105
(pH - 7.688)	0.105
Early LS Present Criterion (mg N	2.148
Early LS Absent Criterion (mg N/	2.148
Early Life Stages Present?	Y
Effective Criterion (mg N/L)	2.148

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.838
(7.204 - pH)	-0.634
(pH - 7.204)	0.634
Trout Present Criterion (mg N/I	7.572
Trout Absent Criterion (mg N/L	11.338
Trout Present?	N
Effective Criterion (mg N/L)	11.338

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.890
90th Percentile pH (SU)	7.939
MIN	2.446
MAX	16.890
(7.688 - pH)	-0.251
(pH - 7.688)	0.251
Early LS Present Criterion (mg N	2.276
Early LS Absent Criterion (mg N/	2.276
Early Life Stages Present?	Y
Effective Criterion (mg N/L)	2.276

8/26/2008 9:26:28 AM

Facility = Riner WWTP
Chemical = dissolved zinc (ug/L)
Chronic averaging period = 4
WLAa = 110
WLAc = 120
Q.L. = 20
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = 130.875
Variance = 6166.17
C.V. = 0.6
97th percentile daily values = 318.473
97th percentile 4 day average = 217.748
97th percentile 30 day average= 157.842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 110
Average Weekly limit = 110
Average Monthly LImit = 110

The data are:

173
232
113
103
141
75
109
101

8/26/2008 9:25:11 AM

Facility = Riner WWTP
Chemical = dissolved copper (ug/L)
Chronic averaging period = 4
WLAa = 14
WLAc = 9.7
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 12
Variance = 51.84
C.V. = 0.6
97th percentile daily values = 29.2010
97th percentile 4 day average = 19.9654
97th percentile 30 day average= 14.4726
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 14
Average Weekly limit = 14
Average Monthly LImit = 14

The data are:

12

8/26/2008 9:33:00 AM

Facility = Riner WWTP
Chemical = ammonia Jan. - May (mg/L)
Chronic averaging period = 30
WLAa = 7.9
WLAc = 2.3
Q.L. = 0.2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 4.64064121485751
Average Weekly limit = 4.64064121485752
Average Monthly LImit = 3.17292576451845

The data are:

9

8/7/2008 11:25:42 AM

Facility = Riner WWTP
Chemical = ammonia (June- Dec.) mg/L
Chronic averaging period = 30
WLAa = 6.8
WLAc = 1.3
Q.L. = 0.2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.6229711214412
Average Weekly limit = 2.6229711214412
Average Monthly LImit = 1.79339282342347

The data are:

9

8/15/2008 8:49:21 AM

Facility = Riner WWTP
Chemical = total recoverable copper (clean metals) ug/L
Chronic averaging period = 4
WLAa = 14
WLAc = 9.7
Q.L. = 2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 25.4
Variance = 232.257
C.V. = 0.6
97th percentile daily values = 61.8088
97th percentile 4 day average = 42.2602
97th percentile 30 day average= 30.6337
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 14
Average Weekly limit = 14
Average Monthly LImit = 14

The data are:

25.4

8/15/2008 8:50:29 AM

Facility = Riner WWTP
Chemical = total recoverable zinc (clean metals) ug/L
Chronic averaging period = 4
WLAa = 110
WLAc = 120
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 88.4
Variance = 2813.24
C.V. = 0.6
97th percentile daily values = 215.114
97th percentile 4 day average = 147.079
97th percentile 30 day average= 106.615
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 110
Average Weekly limit = 110
Average Monthly LImit = 110

The data are:

88.4

7/11/2008 4:04:48 PM

Facility = Riner WWTP
Chemical = TRC (ug/L)
Chronic averaging period = 4
WLAa = 9.5
WLAc = 5.8
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 8.48293374750874
Average Weekly limit = 5.06011312376056
Average Monthly LImit = 4.20432149695269

The data are:

1000

Attachment H

Water Quality Model Calculations

****

REGIONAL MODELING SYSTEM VERSION 3.2

'Existing Conditions w/ 0.035 MGD Plant

****

MODEL SIMULATION FOR THE Riner STP DISCHARGE

TO Mill Creek

THE SIMULATION STARTS AT THE Riner STP DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = .035 MGD cBOD5 = 30 Mg/L TKN = 5 Mg/L D.O. = 6 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.037 Mg/L ****

THE SECTION BEING MODELED IS BROKEN INTO 2 SEGMENTS
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.08300 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.518 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	1.02	0.865	11.765	1.400	0.350	0.227	1990.00	20.70	8.354
2	0.50	1.100	20.000	1.400	0.350	0.227	1970.00	20.70	8.360

(The K Rates shown are at 20°C ... the model corrects them for temperature.)

********** RESPONSE FOR SEGMENT 1 **********

TOTAL STREAMFLOW = 0.1180 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.068	25.763	2.569
0.100	0.100	6.913	25.501	2.562
0.200	0.200	6.773	25.242	2.555
0.300	0.300	6.647	24.985	2.549
0.400	0.400	6.534	24.732	2.542
0.500	0.500	6.433	24.480	2.535
0.600	0.600	6.342	24.232	2.529
0.700	0.700	6.261	23.985	2.522
0.800	0.800	6.189	23.742	2.516
0.900	0.900	6.125	23.500	2.509
1.000	1.000	6.069	23.262	2.502
1.020	1.020	6.058	23.214	2.501

FOR THE TRIBUTARY AT THE END OF SEGMENT 1
FLOW = .3 MGD cBOD5 = 2 Mg/L TKN = 0 Mg/L D.O. = 7.5182 Mg/L

FLOW FROM INCREMENTAL DRAINAGE AREA = 0.0000 MGD

********** RESPONSE FOR SEGMENT 2 **********

TOTAL STREAMFLOW = 0.4180 MGD
(Including Discharge, Tributaries and Incremental D.A. Flow)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	1.020	7.106	10.142	0.706
0.100	1.120	7.161	10.061	0.705
0.200	1.220	7.210	9.980	0.703
0.300	1.320	7.255	9.900	0.702
0.400	1.420	7.295	9.821	0.701
0.500	1.520	7.332	9.743	0.699

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
07-23-1998 07:27:58

DATA FILE = RINERX2.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

"Existing" Conditions w/ C.035 MGD Plant

****

THE NAME OF THE DATA FILE IS: RINERX2.MOD

THE STREAM NAME IS: Mill Creek
THE RIVER BASIN IS: New River
THE SECTION NUMBER IS: 2b
THE CLASSIFICATION IS: IV

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Riner STP

PROPOSED LIMITS ARE:
FLOW = .035 MGD
BOD5 = 30 MG/L
TKN = 5 MG/L
D.O. = 6 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 2

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Brush Creek
GAUGE DRAINAGE AREA = 2.12 SQ.MI.
GAUGE 7Q10 = .083 MGD
DRAINAGE AREA AT DISCHARGE = 2.12 SQ.MI.

STREAM A DRY DITCH AT DISCHARGE (Y/N) = N
ANTIDEGRADATION APPLIES (Y/N) = N

ALLOCATION DESIGN TEMPERATURE = 20.7 °C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: A TRIBUTARY ENTERS AT END

SEGMENT LENGTH = 1.02 MI

SEGMENT WIDTH = 1.55 FT
SEGMENT DEPTH = .67 FT
SEGMENT VELOCITY = 1.1 FT/SEC

DRAINAGE AREA AT SEGMENT START = 2.12 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 2.12 SQ.MI.

ELEVATION AT UPSTREAM END = 2000 FT
ELEVATION AT DOWNSTREAM END = 1980 FT

THE CROSS SECTION IS: IRREGULAR
THE CHANNEL IS: SEVERELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SILT
SLUDGE DEPOSITS = TRACE
AQUATIC PLANTS = FEW
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

TRIBUTARY DATA
FLOW = .3 MGD
BOD5 = 2 MG/L
TKN = 0 MG/L
D.O. = 7.5182 MG/L

SEGMENT INFORMATION

####### SEGMENT # 2 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = .5 MI

SEGMENT WIDTH = 1.55 FT
SEGMENT DEPTH = .67 FT
SEGMENT VELOCITY = 1.1 FT/SEC

DRAINAGE AREA AT SEGMENT START = 2.12 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 2.12 SQ.MI.

ELEVATION AT UPSTREAM END = 1980 FT
ELEVATION AT DOWNSTREAM END = 1960 FT

THE CROSS SECTION IS: IRREGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SILT
SLUDGE DEPOSITS = TRACE
AQUATIC PLANTS = FEW
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
07-23-1998 11:01:41

"Model Run For C:\Documents and Settings\blfrance\My Documents\Working files\BECKY\PERMITS\VPDES\Riner WWTP\Reissuance 2008\Data\rinermodel final violates 2008.mod On 7/14/2008 9:30:30 AM"

"Model is for MILL CREEK."
"Model starts at the RINER WWTP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.11, 2, 0, 7.73, 19.2

violate ammonia limit

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.1, 20, 5.1, ,7, 22.9

"Hydraulic Information for Segment 1"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
1.02, 1.55, .44, .476

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.21, 7.383, 26.429, 4.33, 8.314, 20.9619

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.4, 1.463, 11.765, 12.036, .35, .377, .3728227, .401

"Output for Segment 1"
"Segment starts at RINER WWTP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.383, 26.429, 4.33
.1, .1, 7.036, 25.937, 4.309
.2, .2, 6.748, 25.454, 4.288
.3, .3, 6.509, 24.98, 4.267
.4, .4, 6.313, 24.515, 4.246
.5, .5, 6.153, 24.059, 4.226
.6, .6, 6.024, 23.611, 4.206
.7, .7, 5.921, 23.172, 4.186
.8, .8, 5.841, 22.741, 4.166
.9, .9, 5.78, 22.318, 4.146
1, 1, 5.735, 21.903, 4.126
1.02, 1.02, 5.728, 21.821, 4.122

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.3, 2, 0, ,7.736, 19.2

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, ,7.633, 19.2

```
"Hydraulic Information for Segment 2"
"Length","Width",  "Depth",  "Velocity"
"(mi)",  "(ft)",   "(ft)",   "(ft/sec)"
.5,      1.55,     .488,     .891

"Initial Mix Values for Segment 2"
"Flow",  "DO",     "cBOD",   "nBOD",   "DOSat",  "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.51,     6.909,    11.926,   1.697,    8.481,    19.92549

"Rate Constants for Segment 2. - (All units Per Day)"
"k1",  "k1@T", "k2",   "k2@T", "kn",   "kn@T", "BD",    "BD@T"
1.2,   1.196,  20,     19.965, .35,    .348,   .3361516,
                                                .334

"Output for Segment 2"
"Segment starts at UNNAMED TRIBUTARY"
"Total", "Segm."
"Dist.", "Dist.",  "DO",     "cBOD",   "nBOD"
"(mi)",  "(mi)",   "(mg/l)", "(mg/l)", "(mg/l)"
1.02,    0,        6.909,    11.926,   1.697
1.12,    .1,       7.013,    11.829,   1.693
1.22,    .2,       7.105,    11.732,   1.689
1.32,    .3,       7.186,    11.636,   1.685
1.42,    .4,       7.257,    11.541,   1.681
1.52,    .5,       7.32,     11.447,   1.677


"END OF FILE"
```

violates antidegradation

"Model Run For C:\Documents and Settings\blfrance\My Documents\Working files\BECKY\PERMITS\VPDES\Riner WWTP\Reissuance 2008\Data\rinermodel final no violation 2008 2.mod On 7/21/2008 11:16:52 AM"

"Model is for MILL CREEK."
"Model starts at the RINER WWTP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.11, 2, 0, 7.73, 19.2

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.1, 19, 5.1, ,7, 22.9

"Hydraulic Information for Segment 1"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
1.02, 1.55, .44, .476

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.21, 7.383, 25.238, 4.33, 8.314, 20.9619

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.4, 1.463, 11.765, 12.036, .35, .377, .3728227, .401

"Output for Segment 1"
"Segment starts at RINER WWTP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.383, 25.238, 4.33
.1, .1, 7.057, 24.768, 4.309
.2, .2, 6.786, 24.307, 4.288
.3, .3, 6.562, 23.855, 4.267
.4, .4, 6.378, 23.411, 4.246
.5, .5, 6.228, 22.975, 4.226
.6, .6, 6.107, 22.547, 4.206
.7, .7, 6.011, 22.127, 4.186
.8, .8, 5.936, 21.715, 4.166
.9, .9, 5.879, 21.311, 4.146
1, 1, 5.837, 20.914, 4.126
1.02, 1.02, 5.83, 20.836, 4.122

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.3, 2, 0, ,7.736, 19.2

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, ,7.633, 19.2

```
"Hydraulic Information for Segment 2"
"Length","Width",  "Depth",  "Velocity"
"(mi)",  "(ft)",   "(ft)",   "(ft/sec)"
.5,      1.55,     .488,     .891

"Initial Mix Values for Segment 2"
"Flow",  "DO",     "cBOD",   "nBOD",   "DOSat",  "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.51,     6.951,    11.521,   1.697,    8.481,    19.92549

"Rate Constants for Segment 2. - (All units Per Day)"
"k1",  "k1@T", "k2",   "k2@T", "kn",   "kn@T", "BD",   "BD@T"
1.2,   1.196,  20,     19.965, .35,    .348,   .3361516,
                                                       .334

"Output for Segment 2"
"Segment starts at UNNAMED TRIBUTARY"
"Total", "Segm."
"Dist.", "Dist.",  "DO",     "cBOD",   "nBOD"
"(mi)",  "(mi)",   "(mg/l)", "(mg/l)", "(mg/l)"
1.02,    0,        6.951,    11.521,   1.697
1.12,    .1,       7.053,    11.427,   1.693
1.22,    .2,       7.143,    11.334,   1.689
1.32,    .3,       7.222,    11.241,   1.685
1.42,    .4,       7.291,    11.149,   1.681
1.52,    .5,       7.352,    11.058,   1.677


"END OF FILE"
```

Attachment I

Public Notice

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Montgomery County.
PUBLIC COMMENT PERIOD: 30 days following the public notice issue date; comment period ends 4:30 pm of last day
PERMIT NAME: Virginia Pollutant Discharge Elimination System – Wastewater issued by DEQ, under the authority of the State Water Control Board
NAME, ADDRESS, AND PERMIT NUMBER OF APPLICANT: Montgomery County Public Service Authority, 755 Roanoke Street, Suite 2-I, Christiansburg, VA 24073, VA0024040
NAME AND ADDRESS OF FACILITY: Riner WWTP, 4351 Riner Road, Riner, Virginia 24149
PROJECT DESCRIPTION: Montgomery County Public Service Authority has applied for a reissuance of a permit for the wastewater treatment plant in Montgomery County. The applicant proposes to release treated sewage at a rate of 0.10 MGD from the current facility into a water body. Dewatered sludge from the treatment process will be transported to the Shawsville WWTP for further treatment. The facility proposes to release the treated sewage into Mill Creek in Montgomery County in the New River/ East River Watershed (VAW-N21R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: nutrients, organic matter, solids, metals (copper, zinc).
HOW TO COMMENT: DEQ accepts comments by e-mail, fax, or postal mail. All comments must be in writing and be received by DEQ during the comment period. The public also may request a public hearing.
WRITTEN COMMENTS MUST INCLUDE: DEQ accepts comments by e-mail, fax, or postal mail. All comments must be in writing and be received by DEQ during the comment period. Written comments must include: 1) The names, mailing addresses, and telephone numbers of the person commenting and of all people represented by the citizen. 2) If a public hearing is requested, the reason for holding a hearing, including associated concerns. 3) A brief, informal statement regarding the extent of the interest of the person commenting, including how the operation of the facility or activity affects the citizen. DEQ may hold a public hearing, including another comment period, if a public response is significant and there are substantial, disputed issues relevant to the proposed permit. The public may review the draft permit and application at the DEQ office named below.
CONTACT OF PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION:
NAME: Becky L. France; ADDRESS: Virginia Department of Environmental Quality, West Central Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; PHONE: (540) 562-6700; E-MAIL ADDRESS: blfrance@deq.virginia.gov; FAX: (540) 562-6725

Attachment J

EPA Checksheet

Revised 2/2003

State "FY2003 Transmittal Checklist" to Assist in Targeting Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Riner WWTP

NPDES Permit Number: VA0024040

Permit Writer Name: Becky L. France

Date: 6/5/08

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?			X
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?/			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics – cont. (FY2003)	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?	X		
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water? E. coli	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?			X
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			X
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X

II.D. Water Quality-Based Effluent Limits – cont. (FY2003)	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			X
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont. (FY2003)	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?			X
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			X
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions
Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset
Reporting Requirements
Planned change
Anticipated noncompliance
Transfers
Monitoring reports
Compliance schedules
24-Hour reporting
Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?			
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?			

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?			
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	Yes	No	N/A
1. Is the facility subject to a national effluent limitations guideline (ELG)?			
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?			
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?			
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?			
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?			
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?			
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?			

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ) – cont.	Yes	No	N/A
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?			
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?			

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?			
3. Does the fact sheet provide effluent characteristics for each outfall?			
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?			
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?			
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?			
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?			
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?			
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?			
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			

II.E. Monitoring and Reporting Requirements (FY2003)	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?			
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?			
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?			

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?			
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?			
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?			

List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions

Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset

Reporting Requirements
Planned change
Anticipated noncompliance
Transfers
Monitoring reports
Compliance schedules
24-Hour reporting
Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?			

Part III. Signature Page (FY2003)

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Becky L. France
Title	Environmental Engineer Senior
Signature	Becky L. France
Date	6/5/08